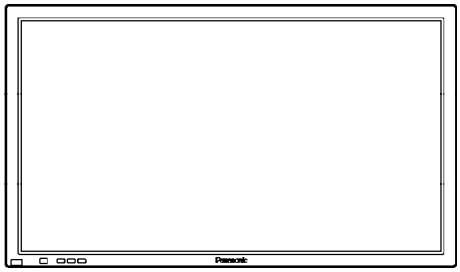
ORDER NO. ITD0207016C1
B02

Service Guide

Wide Plasma Display



TH-50PHW5UZ

GPH5D2 Chassis

Specifications

Power Source:	AC120V 50/60Hz
Power Consumption:	495 W
	2.4W (stand-by condition)
	0.9W (Power off condition)
Plasma Display panel:	Drive method AC type
	50-inch, 16:9 aspect ratio
Contrast Ratio	3000:1
Screen size:	1,106 mm (W)×622 mm (H)
	1,269 mm (diagonal)
	No. of pixels
	1,049,088 (1,366 (W)×768 (H))
	[4,098×768 dots]
Operating condition:	
Temperature	34 °F - 104 °F (0 °C - 40 °C)
Humidity	20 % - 80 %
	Horizontal scanning frequency 15.6 - 110kHz
	Vertical scanning frequency 48 - 120Hz
Connection terminals:	
AV	
Video in	1.0 Vp-p (75-ohm)
S-VIDEO IN (MINI DIN 4PIN)	Y: 1 Vp-p (75-ohm), C: 0.286 Vp-p (75-ohm)
AUDIO IN (RCA PIN JACK × 2)	0.5 Vrms (high impedance)
COMPONENT/RGB	
Y/G	1.0 Vp-p/composite (75-ohm)
	0.7 Vp-p/non-composite (75-ohm)
P_B/B	0.7 Vp-p (75-ohm)
P_R/R	0.7 Vp-p (75-ohm)
HD	1.0 - 5.0 Vp-p (high impedance)
VD	1.0 - 5.0 Vp-p (high impedance)
AUDIO IN (RCA PIN JACK×2)	0.5 Vrms (high impedance)
PC	
(HIGH-DENSITY D-SUB15PIN)	R,G,B/0.7 Vp-p (75-ohm)
	HD, VD/1.0 - 5.0 Vp-p (high impedance)
AUDIO IN (M3 JACK)	0.5Vrms (high impedance)
SERIAL	
EXTERNAL CONTROL TERMINAL (D-SUB9PIN)	RS-232C COMPATIBLE
SPEAKERS (External speakers)	6Ω 16W [8W+8W] (10% THD)
Dimensions (W×H×D):	47.6" (1,210 mm)×28.5" (724mm)×3.9" (98 mm)
Weight (Mass)	approx. 94.8 lbs (42.5 kg) (main unit only)
	approx. 104.9 lbs (47.1kg) (with speakers)

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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TH-50PHW5UZ

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1 Applicable signals

VIDEO input

	signal name	horizontal frequency(kHz)	vertital frequency(Hz)
1	NTSC	15.734	59.95
2	PAL	15.625	50
3	PAL60	15.734	59.95
4	SECAM	15.625	50
5	Modified NTSC	15.734	59.95

*** Mark:**
By installing the optional Terminal Board.

COMPONENT/RGB/PC/DVI input

	signal name	horizontal frequency(kHz)	vertital frequency(Hz)	COMPONENT	RGB	PC	DVI
1	525(480)/60i	15.734	59.94	*	*	*	
2	625(575)/50i	15.625	50	*	*	*	
3	525(480)/60p	31.468	59.94	*	*		
4	625(575)/50p	31.25	50	*	*	*	
5	750(720)/60p	45	60	*	*	*	
6	1125(1080)/60i	33.75	60	*	*	*	
7	1125(1080)/50i	28.125	50	*	*	*	
8	1125(1080)/24p	27	24	*	*	*	
9	1125(1080)/24sF	27	48	*	*	*	
10	640 × 400@70	31.5	70		*	*	
11	640 × 480@60	31.5	59.94		*	*	*
12	Macintosh13"(640 × 480)	35	67		*	*	
13	640 × 480@75	37.5	75		*	*	
14	852 × 480@60	31.7	60		*	*	*
15	800 × 600@60	37.9	60		*	*	*
16	800 × 600@75	46.9	75		*	*	
17	800 × 600@85	53.7	85		*	*	
18	Macintosh16"(832 × 624)	49.7	75		*	*	
19	1,024 × 768@60	48.4	60		*	*	*
20	1,024 × 768@70	56.5	70		*	*	
21	1,024 × 768@75	60	75		*	*	
22	1,024 × 768@85	68.7	85		*	*	
23	Macintosh21"(1,152 × 870)	68.7	75		*	*	
24	1,280 × 1,024@60	64	60		*	*	
25	1,280 × 1,024@75	80	75		*	*	
26	1,280 × 1,024@85	91.1	85		*	*	
27	1,600 × 1,200@60	75	60		*	*	

2 Safety Precautions

2.1. General Guidelines

1. When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
2. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed.
3. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

2.1.1. Leakage Current Cold Check

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the equipment such as screwheads, connectors, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be between 1MΩ and 5.2MΩ.
   When the exposed metal does not have a return path to the chassis, the reading must be ∞ .

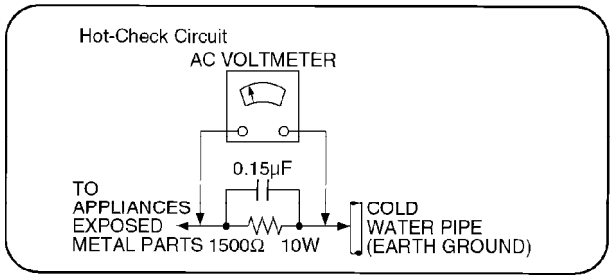


Figure 1

2.1.2. Leakage Current Hot Check (See Figure 1.)

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a 1.5kΩ, 10 watts resistor, in parallel with a 0.15μF capacitors, between each exposed metallic part on the set and a good earth ground such as a water pipe, as shown in Figure 1.
3. Use an AC voltmeter, with 1000 ohms/volt or more sensitivity, to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 volts RMS. A leakage current tester (Simpson Model 229 or equivalent) may be used to make the hot checks, leakage current must not exceed 1/2 milliamp. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the equipment should be repaired and rechecked before it is returned to the customer.

3 Prevention of Electro Static Discharge (ESD) to Electrostatically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by electro static discharge (ESD).

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any ESD on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging ESD wrist strap, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as alminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static (ESD protected)" can generate electrical charge sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, alminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

   Caution

   Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity (ESD) sufficient to damage an ES device).

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are imporant for safety.
These parts are marked by ⚠ in the schematic diagrams, Exploded Views and replacement parts list. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire, or other hazards. Do not modify the original design without permission of manufacturer.

4 About lead free solder (PbF)

Note: Lead is listed as (Pb) in the periodic table of elements.

In the information below, Pb will refer to Lead solder, and PbF will refer to Lead Free Solder.

The Lead Free Solder used in our manufacturing process and discussed below is (Sn+Ag+Cu).

That is Tin (Sn), Silver (Ag) and (Cu) although other types are available.

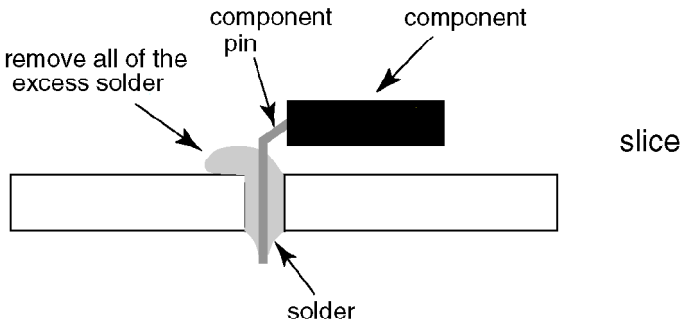
This model uses Pb Free solder in it's manufacture due to environmental conservation issues. For service and repair work, we'd suggest the use of Pb free solder as well, although Pb solder may be used.

PCBs manufactured using lead free solder will have the PbF within a leaf Symbol (PbF) stamped on the back of PCB.

Caution

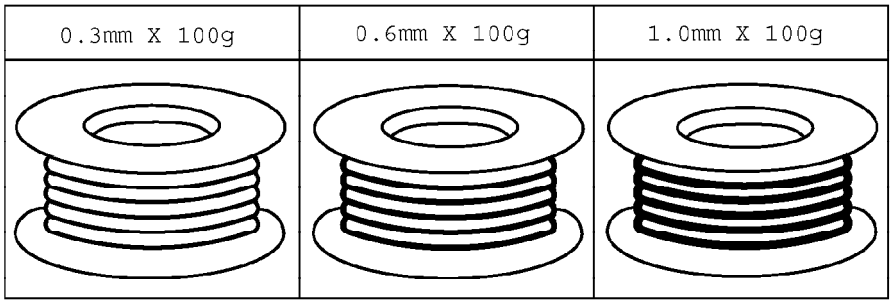
- Pb free solder has a higher melting point than standard solder. Typically the melting point is 50 ~ 70 °F (30~40°C) higher. Please use a high temperature soldering iron and set it to 700 ± 20 °F (370 ± 10 °C).
- Pb free solder will tend to splash when heated too high (about 1100 °F or600°C).

  If you must use Pb solder, please completely remove all of the Pb free solder on the pins or solder area before applying Pb solder. If this is not practical, be sure to heat the Pb free solder until it melts, before applying Pb solder.
- After applying PbF solder to double layered boards, please check the component side for excess solder which may flow onto the opposite side. (see figure below)



Suggested Pb free solder

There are several kinds of Pb free solder available for purchase. This product uses Sn+Ag+Cu (tin, silver, copper) solder. However, Sn+Cu (tin, copper), Sn+Zn+Bi (tin, zinc, bismuth) solder can also be used.



5 PCB Structure sheet of GPH5D2 chassis

Board Name	Function	Remarks
D1	Format Converter	1
D2	Plasma AI Sub-Field Processor	1
Z	Audio out	
SS	Scan out	1
SC	Scan out	1
SU	Sustain connection (Upper)	1
SD	Sustain connection (Lower)	1
C1	Data Drive (Upper Left)	
C2	Data Drive (Upper Center)	
C3	Data Drive (Upper Right)	
C4	Data Drive (Lower Right)	
C5	Data Drive (Lower Center)	
C6	Data Drive (Lower Left)	
C9	Energy recovery circuit	
H3	Speaker terminal	
S1	Power switch	
SS2	Sustain connection (Upper)	
SS3	Sustain connection (Lower)	
V1	Front SW. & Remote receiver	
F	Line filter	
P	Power supply	1
P3	Drive voltage oscillator	
P5	Primary oscillator	
P6	PFC oscillator	
P7	Drive voltage protection	
P8	Process voltage protection	
HX	PC_type_Input terminal	
HZ	RCA type_Input terminal	

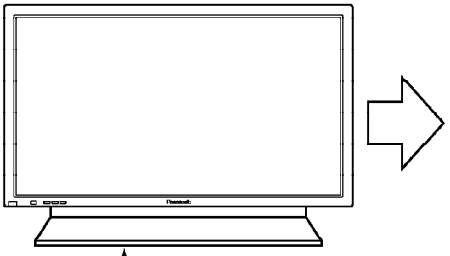
Remarks

1. Recommend PCB´s for initial service for GPH5D2 chassis.

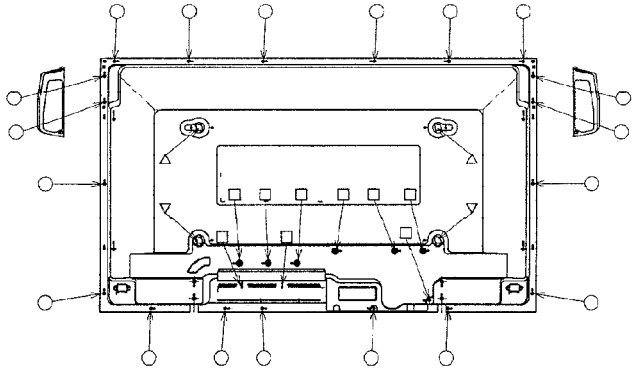
6 Service Hint

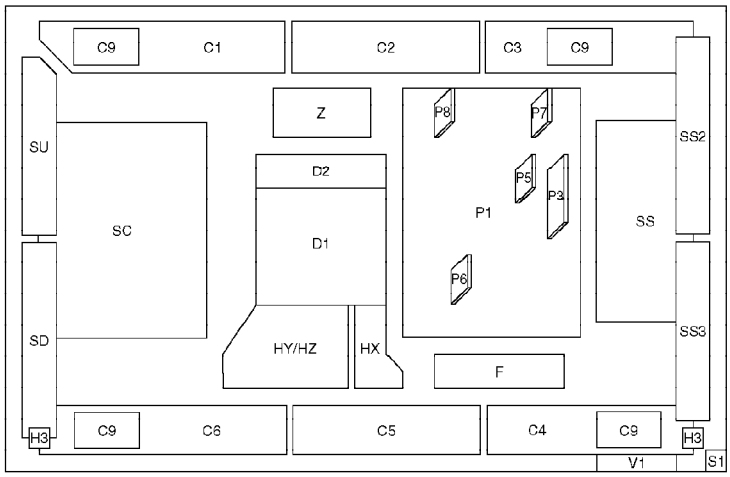
Remove the Back Cover

Stand the Unit used for Optional Accessory



Optional Accessory
(Pedestal)

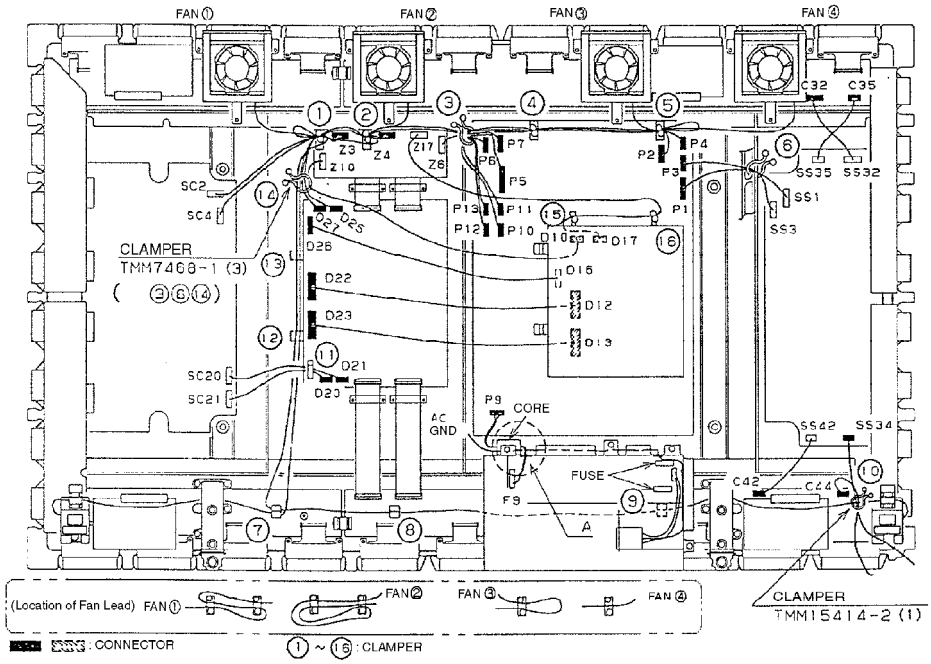




Remove: 4 screws (△) XYN8+F20FZ
5 screws (□) THEL023Z
18 screws (○) XYN4+F38FZ

Service Position

7 Location of Lead Wiring



CON:NO	— CON:NO	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯
Z3	— H37	◎	○					○					○	○	○		
Z4	— H37	◎	○					○	○	○	○		○	○	○		
SC2	— P2	○	○	○	○	○											
SC4	— P4	○	○	○	○	○											
SC20	— D20											○					
SC21	— D21											○					
Z10	— D10														○		
Z17	— D17															○	○
Z6	— P6			○													
D25	— P5	○	○	○											○		
D27	— P7	○	○	○											○		
P3	— SS3						○										
P1	— SS1						○										
POWER SW	— C44										○						
INPUT SW	— SS34										○						
FAN1	— P10~P13	◎	◎	○													
FAN2	— P10~P13	◎	●	○													
FAN3	— P10~P13			○	○	◎											
FAN4	— P10~P13			○	○	○											

◎ Wind up second times. ● Wind up third times.

Connector Connection
D21, D21, D22, D23, D25, D26, D27, D10, D12, D13, D17,
P1, P2, P3, P4, P5, P6, P7, P9, P10, P11, P12, P13,
C32, C35, C42, C44,
SS34,
AC INLET

8 Adjustment Procedure

8.1. +B Set-up

8.1.1. Item / Preparation

1. Input a Grey scale signal.
2. Set the picture controls: -
   Picture mode: Normal
   White balance: Normal

8.1.2. Adjustments

Adjust and confirm indicated test point for the specified voltage.

Adjust

Name	Test point	Voltage	Volume
PFC	P24 pin 1	400V ±1V	R548
Vsus	P1 pin 2	175V ±1V	R639
Vda	P3 pin 1	75.0V ±0.5V	R545

Confirm

Name	Test point	Voltage
+18V	P4 pin 1	17.2V ±0.5V
+13.5V	P5 pin 1	13.2V ±0.5V
Audio +15V	P6 pin 1	13.5V ±0.5V
Audio -15V	P6 pin 3	-13.5V ±0.5V
5.25V	P5 pin 5	5.1V ±0.3V
STB5V	P7 pin4	5.0V ±0.3V

8.2. Driver Set-up

8.2.1. Item / Preparation

1. Input an APL 100 % white signal.
2. Set the picture controls: -
   Picture mode: Normal
   White balance: Cool
   Aspect: 16:9

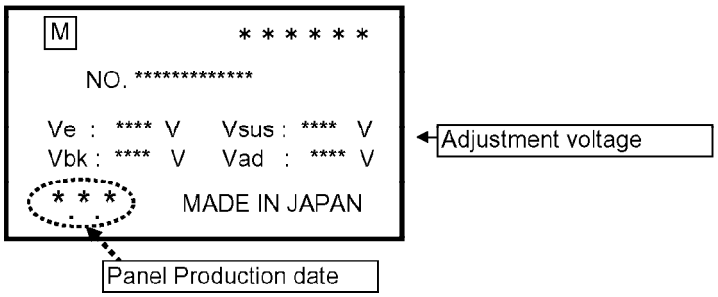
8.2.2. Adjustments

Adjust driver section voltages referring the panel data on the panel data label.

Name	Test point	Voltage	Volume
Vsus	TPVSUS (SS-BOARD)	Vsus ±1V*	R639 (P3-BOARD)
Vbk	TPVBK (SC-BOARD)	Vbk ±5V*	R6670 (SC-BOARD)
Ve	TPVE (SS-BOARD)	Ve ±1V*	R6770 (SS-BOARD)
Vset	TPVSET (SC-BOARD)	218 V ±6V	—
Vad	TPVAD (SC-BOARD)	Vad ±1V*	R6477 (SC-BOARD)
Vda	TP117 (C9-BOARD)	74V±1V	R545 (P1-BOARD)
Vscn	TPVSCN (SC-BOARD)	Vad+118±2V	—

*See the Panel label.

Panel Label information



Panel Production date

For Example

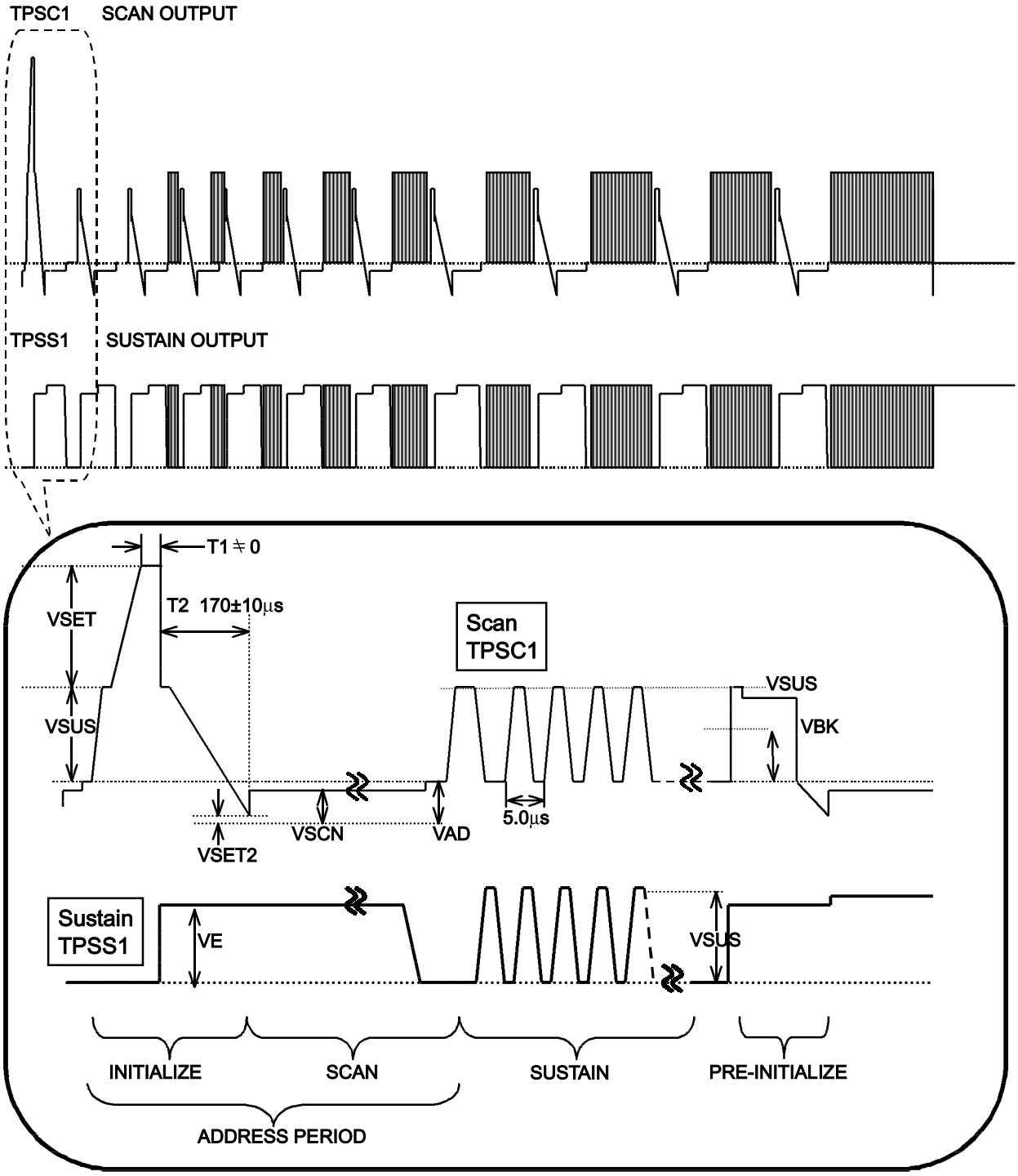
1 .	7 .	1	-- > Beg. of July, 2001
Year	Month		
		1	Beginning of Month (1-10)
		2	Middle of Month (11-20)
		3	End of Month (21-31)
	1	January	
	2	February	
	3	March	
	:	:	
	9	September	
	O	October	
	N	November	
	D	December	
9	1999		
0	2000		
1	2001		
:			

8.3. Initialization Pulse Adjust

1. Input a Cross hatch signal.
2. Set the picture controls: -
   Picture mode: Normal
   White balance: Cool

Adjust the indicated test point for the specified wave form.

	Test point	Volume	Level
T1	TPSC1 (SC)	R6523 (SC)	≒ 0 Sec
T2	TPSC1 (SC)	R6557 (SC)	170 ± 10μ Sec



8.4. P.C.B. (Printed Circuit Board) exchange

8.4.1. Caution

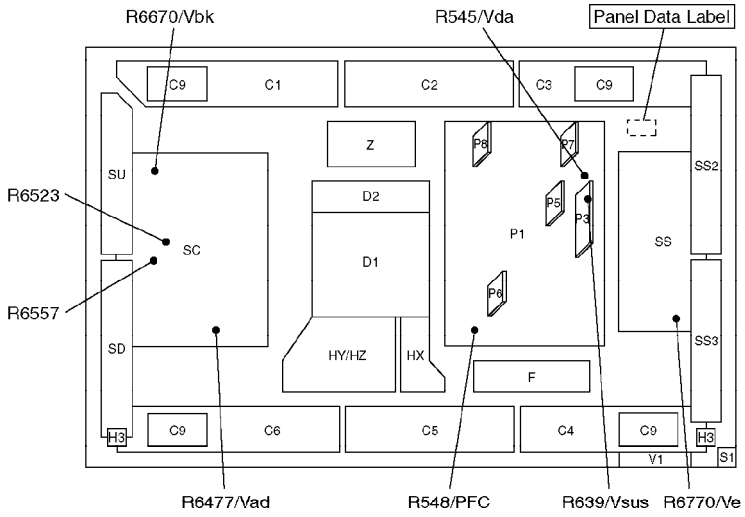
1. To remove P.C.B. , wait 1 minute after power was off for discharge from electrolysis capacitors.

8.4.2. Quick adjustment after P.C.B. exchange

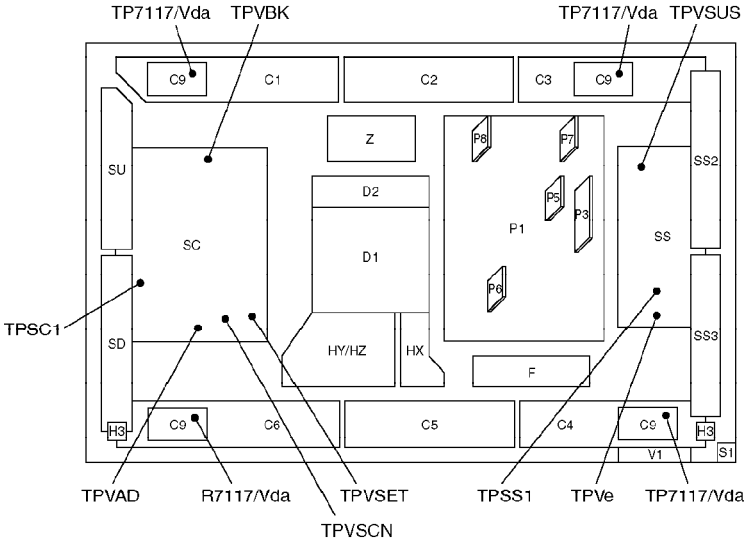
P.C.B.	Item	Volume	Test point	Level
P board	PFC	R548 (P3)	P24 connector pin 1	400V ± 1V
	Vsus	R639 (P3)	TPVsus (SS)	Vsus ± 1V*
	Vda	R545 (P1)	TP117 (C9)	74V ± 1V
SC board	Vad	R6477 (SC)	TPVAD (SC)	Vad ± 1V*
	Vbk	R6670 (SC)	TPVBK (SC)	Vbk ± 5V*
SS board	Ve	R6770 (SS)	TPVE (SS)	Ve ± 1V*
D1, D2 board	White balance, Pedestal and Sub brightness for NTSC, PAL, HD, PC and 625I signals.			

*See the Panel label.

8.5. Adjustment Volume Location



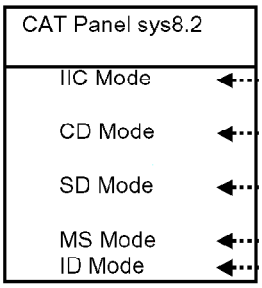
8.6. Test Point Location



9 Service mode

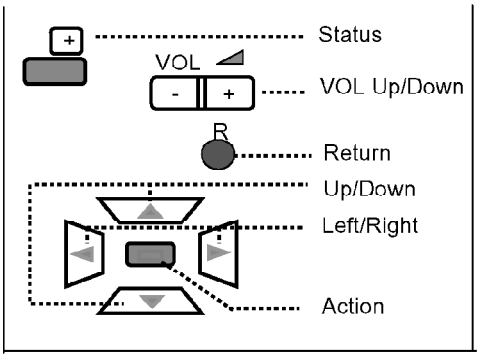
9.1. CAT (computer Aided Test) mode

CAT mode menu



Mode	Function	Access button
IIC	Service Alignment	Action
CD(Complete Diagnostics)	Software version information EEPROM edit	Mute more than 5 seconds
SD(Status Display)	MTBF parameter	Action
MS Mode	Not use	-----
ID	Not use	-----

Remote control



How to access the CAT mode.

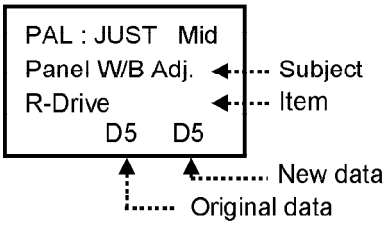
Press and the hold the Volume down / - buton on the front panel of the unit and press the status button on the remote control 3 times quickly within 1 second, this will place the unit into the CAT mode.

To exit the CAT mode, access the ID mode and switch off the main power.

9.1.1. IIC mode

Select the IIC mode by Up/Down button on the remote control at the front page of CAT mode then press the Action button on the remote control.

OSD



How to use the IIC mode.

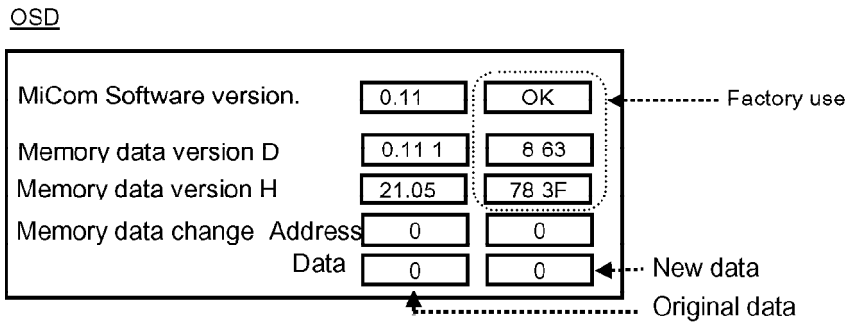
1. Select the alignment **Subject** by **Up/Down buttons** on the remote control.
2 .Select the alignment **Item** by **Left/Right buttons** on the remote control.
3. Adjust **optimum setting** by **Volume Up/Down buttons** on the remote control.
4. The **data is memorized** when press the **R button** on the remote control or change the alignment Subject (or Items).

Subject and item are mentioned on page 14.

To exit the IIC mode, press the R button on the remote control.

9.1.2. CD mode

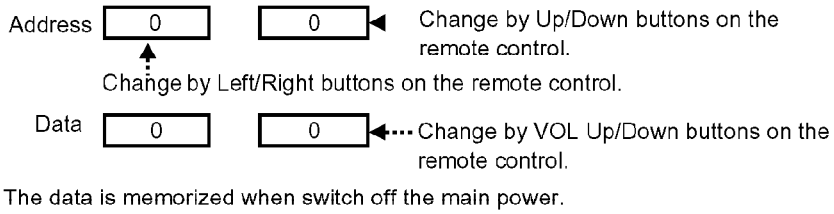
Select the CD mode by Up/Down button on the remote control at the front page of CAT mode then press the Mute button on the remote control more than 5 sec.



Micom software version (IC9354), this version can be upgrade by

1. **replace of new version IC**
2. **Loading the new version software from loader tool, TZSC07036.**

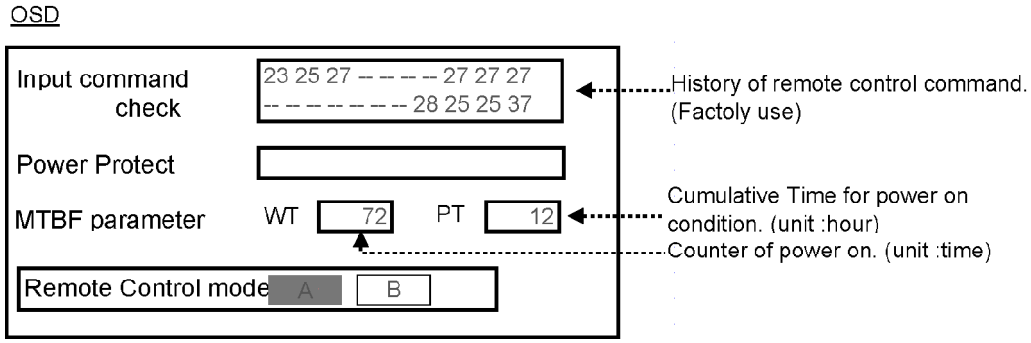
Memory data change


Address
0
0
Change by Up/Down buttons on the remote control.
Change by Left/Right buttons on the remote control.
Data
0
0
Change by VOL Up/Down buttons on the remote control.
The data is memorized when switch off the main power.

To exit the CD mode, press the R button on the remote control.

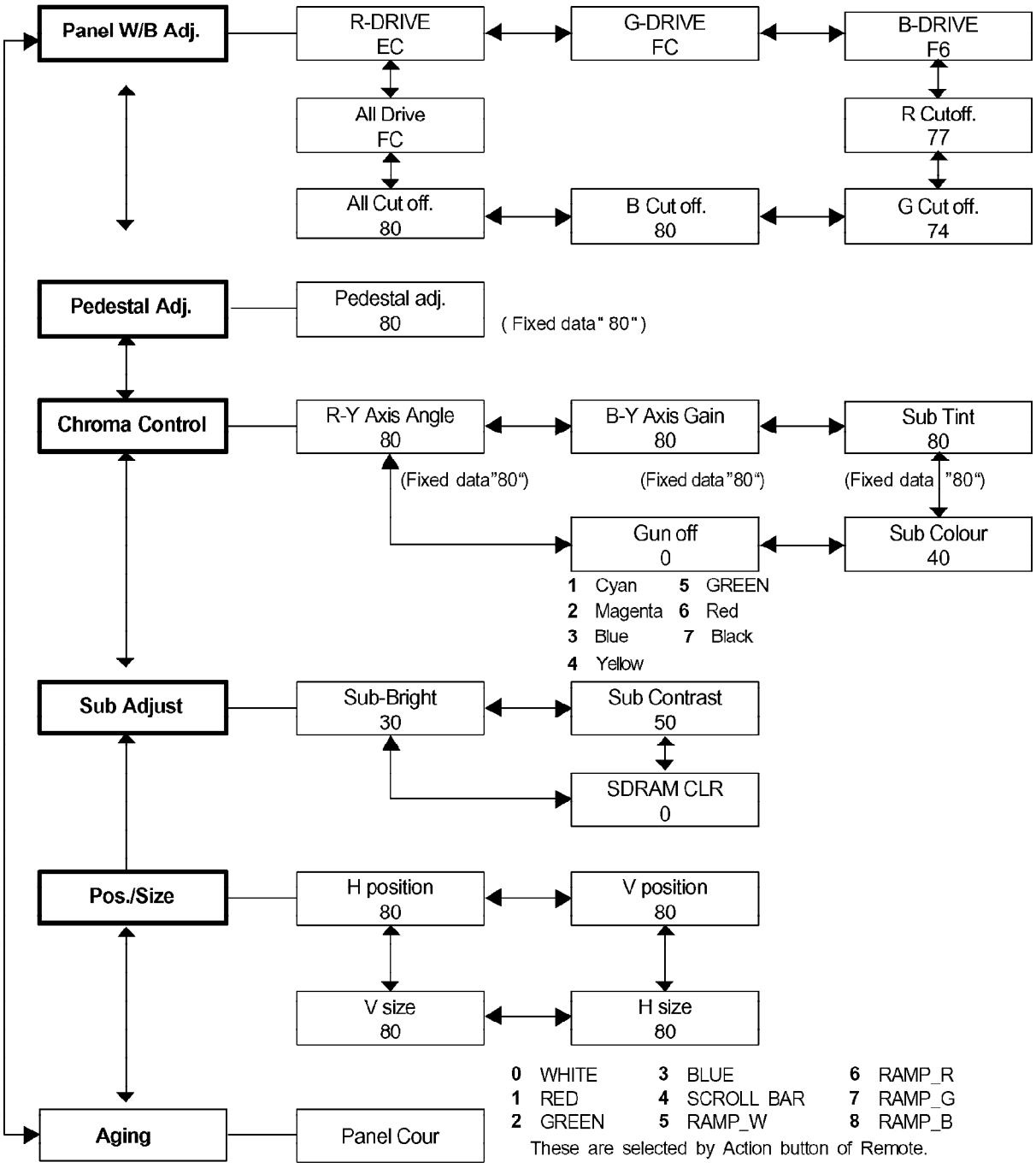
9.1.3. SD mode

Select the SD mode by Up/Down button on the remote control at the front page of CAT mode then press the Action button on the remote control.



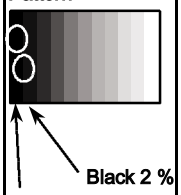
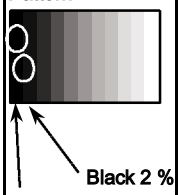
To exit the SD mode, press the R button on the remote control.

9.2. IIC mode structure (following items value is sample data.)

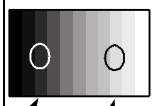


10 Alignment

10.1. Pedestal setting

	INPUT	Equipment	Setting	Alignment menu	Procedure
1	Component (525i, 525p, 625i, 720i or 1080i) Gray Scale Pattern  		Picture: Normal White balance: **Cool** Aspect: 16:9	PANEL W/B R cut off G cut off B cut off Chroma Control: Gun off RGB Sub Adjust: G Sub Bright Chroma Control: Gun off RGB Sub Adjust: B Sub Bright Chroma Control: Gun off RGB Sub Adjust: R Sub Bright	** Adjust at the dark room. 1) Set R,G and B cut off to " **80** ". 2) Set Gun off to "**5**". (Only green pixels can emit.) 3) Adjust G Sub bright to start some of green pixels emission at black 2% area and no emission at black 0% area. 4) Set Gun off to "**3**". (Only blue pixels can emit.) 5) Adjust B Sub bright to start some of blue pixels emission at black 2% area and no emission at black 0% area. 6) Set Gun off to "**6**". (Only red pixels can emit.) 7) Adjust R Sub bright to start some of red pixels emission at black 2% area and no emission at black 0% area.
2	RGB(PC) Gray Scale Pattern  		Picture: Normal White balance: **Cool** Aspect: 16:9	PANEL W/B R,G,B cut off PANEL W/B R,G,B Drive	1) Change input to RGB signal. 2) Repeat procedure 1) to 7) of Component input signal.

10.2. NTSC panel white balance

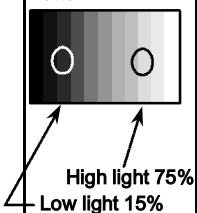
	INPUT	Equipment	Setting	Alignment menu	Procedure
1	NTSC Gray Scale Pattern  	Color Analyzer	Picture: Normal White balance: **Cool** Aspect: 16:9	Sub Adjust Sub Bright PANEL W/B G cut off PANEL W/B B cut off R cut off Sub Adjust Sub Bright PANEL W/B G Drive PANEL W/B B Drive R Drive PANEL W/B R,G,B Drive R,G,B Drive PANEL W/B R,G,B cut off	1) Find the nearest area to brightness of 10 cd/m2 as Low light by color sensor. 2) Adjust Sub bright to set Low light level to 10 cd/m2 exactly. 3) Set G cut off to " 80 ". 4) Adjust B and R cut off to set color temperature as shown Fig.-01. 5) If Sub Bright is changed re-adjust it to set Low light to 10 cd/m2. 6)Find 75% of white area by color sensor. 7) Set G Drive to " D8 ". 8) Adjust B and R Drive to set color temperature as shown Fig.-01. 9) Repeat item 4) to 7) to set both Low light and high light. 10) Increase same steps of R, G and B Drive to set largest level of 3 color drive to "FC". 11) Re-adjust Low light level again. Fig. -01
2			Picture: Normal White balance: **Normal** Aspect: 16:9	PANEL W/B R,G,B cut off PANEL W/B R,G,B Drive	1) Change white balance to "Normal". 2) Repeat procedure 3) to 11) of Cool mode.
3			Picture: Normal White balance: **Warm** Aspect: 16:9	PANEL W/B R,G,B cut off PANEL W/B R,G,B Drive	1) Change white balance to "Warm". 2) Repeat procedure 3) to 11) of Cool mode.
4			Picture: Normal White balance: **Cool** Aspect: 16:9	Picture Menu Sub Adjust Sub Bright	1) Change color templature to "Cool". 2)Re-set Sub bright to "30"

Color Temp.	x	y
Cool(Hi)	0.272	0.290
Normal(Mid)	0.288	0.296
Warm(Low)	0.313	0.329

Note:

OSD is the difference between US model and Except US model.
Picture:Normal (Except US)/Standard (US model)
White balance (Except US)/Color Temp (US model)

10.3. PAL/SECAM panel white balance

	INPUT	Equipment	Setting	Alignment menu	Procedure
1	PAL Gray Scale Pattern  	Color Analyzer	Picture: Normal White balance: **Cool** Aspect: 16:9	Sub Adjust Sub Bright PANEL W/B G cut off PANEL W/B B cut off R cut off Sub Adjust Sub Bright PANEL W/B G Drive PANEL W/B B Drive R Drive PANEL W/B R,G,B Drive R,G,B Drive PANEL W/B R,G,B cut off	1) Find the nearest area to brightness of 10 cd/m2 as Low light by color sensor. 2) Adjust Sub bright to set Low light level to 10 cd/m2 exactly. 3) Set G cut off to " 80 ". 4) Adjust B and R cut off to set color temperature as shown Fig.-02. 5) If Sub Bright is changed re-adjust it to set Low light to 10 cd/m2. 6)Find 75% of white area by color sensor. 7) Set G Drive to " D8 ". 8) Adjust B and R Drive to set color temperature as shown Fig.-02. 9) Repeat procedure 4) to 7) to set both Low light and high light. 10) Increase same steps of R, G and B Drive to set largest level of 3 color drive to "FC". 11) Re-adjust Low light level again. Color Temp. / x / y Cool(Hi) / 0.272 / 0.290 Normal(Mid) / 0.288 / 0.296 Warm(Low) / 0.313 / 0.329 Fig. -02
2			Picture: Normal White balance: **Normal** Aspect: 16:9	PANEL W/B R,G,B cut off PANEL W/B R,G,B Drive	1) Change white balance to "Normal". 2) Repeat procedure 3) to 11) of Cool mode.
3			Picture: Normal White balance: **Warm** Aspect: 16:9	PANEL W/B R,G,B cut off PANEL W/B R,G,B Drive	1) Change white balance to "Warm". 2) Repeat procedure 3) to 11) of Cool mode.
4			Picture: Normal White balance: **Cool** Aspect: 16:9	Picture Menu Sub Adjust Sub Bright	1) Change color templature to "Cool". 2)Re-set Sub bright to "30"

<table>
<tr><th></th><th></th><th>Equipment</th><th>Setting</th><th>Alignment menu</th><th>Procedure</th></tr>
<tr><td>5</td><td>

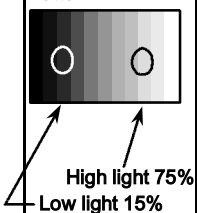
SECAM signal</td><td></td><td>Picture:
Normal
Aspect:
16:9

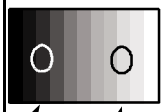
White balance:
Cool
Normal
Warm</td><td></td><td>1) Write down each color temaparature of R,G,B drive and Cut off data as follows.

<table><tr><td>White Balance</td><td>Cool</td><td>Normal</td><td>Warm</td></tr><tr><td>R Drive</td><td></td><td></td><td></td></tr><tr><td>G Drive</td><td></td><td></td><td></td></tr><tr><td>B Drive</td><td></td><td></td><td></td></tr><tr><td>R Cut off</td><td></td><td></td><td></td></tr><tr><td>G Cut off</td><td></td><td></td><td></td></tr><tr><td>B Cut off</td><td></td><td></td><td></td></tr></table>
2) Input SECAM signal.

3) Copy PAL R,G,B drive and cut off data of each white balance mode to SECAM position.</td></tr>
</table>

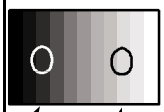
10.4. PC/RGB panel white balance

	INPUT	Equipment	Setting	Alignment menu	Procedure
1	PC Gray Scale Pattern  	Color Analyzer	Picture: Normal White balance: **Cool** Aspect: 16:9	Sub Adjust Sub Bright PANEL W/B G cut off PANEL W/B B cut off R cut off Sub Adjust Sub Bright PANEL W/B G Drive PANEL W/B B Drive R Drive PANEL W/B R,G,B Drive R,G,B Drive PANEL W/B R,G,B cut off	1) Find the nearest area to brightness of 10 cd/m2 as Low light by color sensor. 2) Adjust Sub bright to set Low light level to 10 cd/m2 exactly. 3) Set G cut off to " 80 ". 4) Adjust B and R cut off to set color temperature as shown Fig.-03. 5) If Sub Bright is changed re-adjust it to set Low light to 10 cd/m2. 6)Find 75% of white area by color sensor. 7) Set G Drive to " D8 ". 8) Adjust B and R Drive to set color temperature as shown Fig.-03. 9) Repeat item 4) to 7) to set both Low light and high light. 10) Increase same steps of R, G and B Drive to set largest level of 3 color drive to "FC". 11) Re-adjust Low light level again. Color Temp. / x / y Cool(Hi) / 0.272 / 0.290 Normal(Mid) / 0.288 / 0.296 Warm(Low) / 0.313 / 0.329 Fig. -03
2			Picture: Normal White balance: **Normal** Aspect: 16:9	PANEL W/B R,G,B cut off PANEL W/B R,G,B Drive	1) Change white balance to "Normal". 2) Repeat procedure 3) to 11) of Cool mode.
3			Picture: Normal White balance: **Warm** Aspect: 16:9	PANEL W/B R,G,B cut off PANEL W/B R,G,B Drive	1) Change white balance to "Warm". 2) Repeat procedure 3) to 11) of Cool mode.
4			Picture: Normal White balance: **Cool** Aspect: 16:9	Picture Menu Sub Adjust Sub Bright	1) Change color templature to "Cool". 2)Re-set Sub bright to "30"

<table>
<tr><th></th><th>INPUT</th><th>Equipment</th><th>Setting</th><th>Alignment menu</th><th>Procedure</th></tr>
<tr><td>5</td><td>RGB
Gray Scale
Pattern
 
High light 75%
Low light 15%</td><td></td><td>Picture:
Normal
Aspect:
16:9

White balance:
Cool
Normal
Warm</td><td></td><td>1) Write down each color temaparature of R,G,B drive and Cut off data as follows.

<table><tr><th>White Balance</th><th>Cool</th><th>Normal</th><th>Warm</th></tr><tr><td>R Drive</td><td></td><td></td><td></td></tr><tr><td>G Drive</td><td></td><td></td><td></td></tr><tr><td>B Drive</td><td></td><td></td><td></td></tr><tr><td>R Cut off</td><td></td><td></td><td></td></tr><tr><td>G Cut off</td><td></td><td></td><td></td></tr><tr><td>B Cut off</td><td></td><td></td><td></td></tr></table>
2) Input RGB signal.

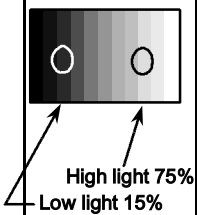
3) Copy PC R,G,B drive and cut off data of each white balance mode to RGB position.</td></tr>
<tr><td>6</td><td>DVI
Gray Scale
Pattern
 
High light 75%
Low light 15%</td><td></td><td>Picture:
Normal
Aspect:
16:9

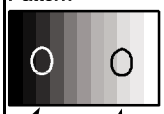
White balance:
Cool
Normal
Warm</td><td></td><td>1) Write down each color temaparature of R,G,B drive and Cut off data as follows.

<table><tr><th>White Balance</th><th>Cool</th><th>Normal</th><th>Warm</th></tr><tr><td>R Drive</td><td></td><td></td><td></td></tr><tr><td>G Drive</td><td></td><td></td><td></td></tr><tr><td>B Drive</td><td></td><td></td><td></td></tr><tr><td>R Cut off</td><td></td><td></td><td></td></tr><tr><td>G Cut off</td><td></td><td></td><td></td></tr><tr><td>B Cut off</td><td></td><td></td><td></td></tr></table>
2) Input DVI signal.

3) Copy PC R,G,B drive and cut off data of each white balance mode to DVI position.</td></tr>
</table>

10.5. HD/ 525i /525p panel white balance

	INPUT	Equipment	Setting	Alignment menu	Procedure
1	HD (720i or 1080i) Gray Scale Pattern  	Color Analyzer	Picture: Normal White balance: **Cool** Aspect: 16:9	Sub Adjust Sub Bright PANEL W/B G cut off PANEL W/B B cut off R cut off Sub Adjust Sub Bright PANEL W/B G Drive PANEL W/B B Drive R Drive PANEL W/B R,G,B Drive R,G,B Drive PANEL W/B R,G,B cut off	1) Find the nearest area to brightness of 10 cd/m2 as Low light by color sensor. 2) Adjust Sub bright to set Low light level to 10 cd/m2 exactly. 3) Set G cut off to " 80 ". 4) Adjust B and R cut off to set color temperature as shown Fig.-04. 5) If Sub Bright is changed re-adjust it to set Low light to 10 cd/m2. 6)Find 75% of white area by color sensor. 7) Set G Drive to " D8 ". 8) Adjust B and R Drive to set color temperature as shown Fig.-04. 9) Repeat item 4) to 7) to set both Low light and high light. 10) Increase same steps of R, G and B Drive to set largest level of 3 color drive to "FC". 11) Re-adjust Low light level again. Color Temp. / x / y Cool(Hi) / 0.272 / 0.290 Normal(Mid) / 0.288 / 0.296 Warm(Low) / 0.313 / 0.329 Fig. -04
2			Picture: Normal White balance: **Normal** Aspect: 16:9	PANEL W/B R,G,B cut off PANEL W/B R,G,B Drive	1) Change white balance to "Normal". 2) Repeat procedure 3) to 11) of Cool mode.
3			Picture: Normal White balance: **Warm** Aspect: 16:9	PANEL W/B R,G,B cut off PANEL W/B R,G,B Drive	1) Change white balance to "Warm". 2) Repeat procedure 3) to 11) of Cool mode.
4			Picture: Normal White balance: **Cool** Aspect: 16:9	Picture Menu Sub Adjust Sub Bright	1) Change color templature to "Cool". 2)Re-set Sub bright to "30"

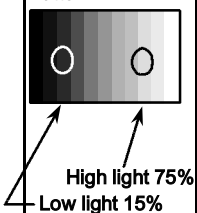
<table>
<tr><th></th><th>INPUT</th><th>Equipment</th><th>Setting</th><th>Alignment menu</th><th>Procedure</th></tr>
<tr><td>5</td><td>RGB
Gray Scale
Pattern
 
High light 75%
Low light 15%</td><td></td><td>Picture:
Normal
Aspect:
16:9

White balance:
Cool
Normal
Warm</td><td></td><td>1) Write down each color temaparature of R,G,B drive and Cut off data as follows.

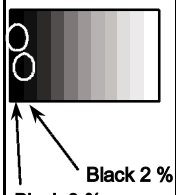
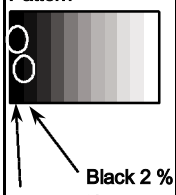
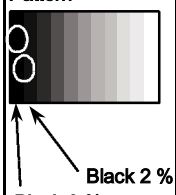
<table><tr><td>White Balance</td><td>Cool</td><td>Normal</td><td>Warm</td></tr><tr><td>R Drive</td><td></td><td></td><td></td></tr><tr><td>G Drive</td><td></td><td></td><td></td></tr><tr><td>B Drive</td><td></td><td></td><td></td></tr><tr><td>R Cut off</td><td></td><td></td><td></td></tr><tr><td>G Cut off</td><td></td><td></td><td></td></tr><tr><td>B Cut off</td><td></td><td></td><td></td></tr></table>
2)Change input signal to 525i and 525p.

3) Copy HD drive and cut off data of each white balance mode to each signals position.</td></tr>
</table>

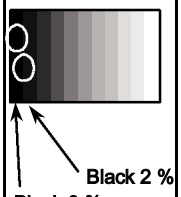
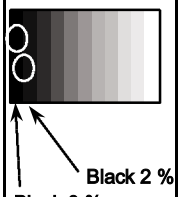
10.6. 625i panel balance

	INPUT	Equipment	Setting	Alignment menu	Procedure
1	625i Gray Scale Pattern  	Color Analyzer	Picture: Normal White balance: **Cool** Aspect: 16:9	Sub Adjust Sub Bright PANEL W/B G cut off PANEL W/B B cut off R cut off Sub Adjust Sub Bright PANEL W/B G Drive PANEL W/B B Drive R Drive PANEL W/B R,G,B Drive R,G,B Drive PANEL W/B R,G,B cut off	1) Find the nearest area to brightness of 10 cd/m2 as Low light by color sensor. 2) Adjust Sub bright to set Low light level to 10 cd/m2 exactly. 3) Set G cut off to " 80 ". 4) Adjust B and R cut off to set color temperature as shown Fig.-05. 5) If Sub Bright is changed re-adjust it to set Low light to 10 cd/m2. 6)Find 75% of white area by color sensor. 7) Set G Drive to " D8 ". 8) Adjust B and R Drive to set color temperature as shown Fig.-05. 9) Repeat item 4) to 7) to set both Low light and high light. 10) Increase same steps of R, G and B Drive to set largest level of 3 color drive to "FC". 11) Re-adjust Low light level again. Color Temp. / x / y Cool(Hi) / 0.272 / 0.290 Normal(Mid) / 0.288 / 0.296 Warm(Low) / 0.313 / 0.329 Fig. -05
2			Picture: Normal White balance: **Normal** Aspect: 16:9	PANEL W/B R,G,B cut off PANEL W/B R,G,B Drive	1) Change white balance to "Normal". 2) Repeat procedure 3) to 11) of Cool mode.
3			Picture: Normal White balance: **Warm** Aspect: 16:9	PANEL W/B R,G,B cut off PANEL W/B R,G,B Drive	1) Change white balance to "Warm". 2) Repeat procedure 3) to 11) of Cool mode.
4			Picture: Normal White balance: **Cool** Aspect: 16:9	Picture Menu Sub Adjust Sub Bright	1) Change color templature to "Cool". 2)Re-set Sub bright to "30"

10.7. Sub brightness setting

	INPUT	Equipment	Setting	Alignment menu	Procedure
1	NTSC Gray Scale Pattern  		Picture: Normal Aspect: 16:9	PANEL W/B All cut off	** Adjust at the dark room. 1) Set white balance to **Cool**. 2) Adjust All cut off to start some pixels emission at black 2% area and no emission at black 0% area. 3) Write down all cut off data. 4) Set white balance to **Normal**. 5) Adjust All cut off to set same data of Cool mode. 6) Set white balance to **warm**. 7) Adjust All cut off to set same data of Cool mode.
2	PAL Gray Scale Pattern  		Picture: Normal Aspect: 16:9	PANEL W/B All cut off	** Adjust at the dark room. 1) Set white balance to **Cool**. 2) Adjust All cut off to start some pixels emission at black 2% area and no emission at black 0% area. 3) Write down all cut off data. 4) Set white balance to **Normal**. 5) Adjust All cut off to set same data of Cool mode. 6) Set white balance to **warm**. 7) Adjust All cut off to set same data of Cool mode.
	SECAM Gray Scale Pattern				8) Change to SECAM signal. 9) Copy PAL All cut off data to SECAM mode.
3	PC Gray Scale Pattern  		Picture: Normal Aspect: 16:9	PANEL W/B All cut off	** Adjust at the dark room. 1) Set white balance to **Cool**. 2) Adjust All cut off to start some pixels emission at black 2% area and no emission at black 0% area. 3) Write down all cut off data. 4) Set white balance to **Normal**. 5) Adjust All cut off to set same data of Cool mode. 6) Set white balance to **warm**. 7) Adjust All cut off to set same data of Cool mode.
	RGB Gray Scale Pattern				8) Change to RGB input signal. 9) Copy PC All cut off data to RGB mode.
	DVI Gray Scale Pattern				10) Change to DVI input signal. 11) Copy PC All cut off data to DVI mode.

TH-50PHW5UZ

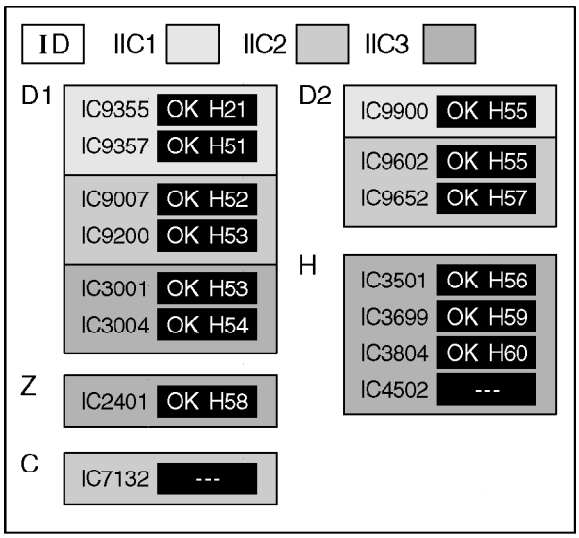
	INPUT	Equipment	Setting	Alignment menu	Procedure
4	525i Gray Scale Pattern  		Picture: Normal Aspect: 16:9	PANEL W/B All cut off	** Adjust at the dark room. 1) Set white balance to **Cool**. 2) Adjust All cut off to start some pixels emission at black 2% area and no emission at black 0% area. 3) Write down all cut off data. 4) Set white balance to **Nornal**. 5) Adjust All cut off to set same data of Cool mode. 6) Set white balance to **warm**. 7) Adjust All cut off to set same data of Cool mode.
	525p Gray Scale Pattern				8) Change to 525p signal. 9) Copy 525i All cut off data to 525p mode.
	HD (720i or 1080i) Gray Scale Pattern				8) Change to HD signal. 9) Copy 525i All cut off data to HD mode.
5	625i Gray Scale Pattern  		Picture: Normal Aspect: 16:9	PANEL W/B All cut off	** Adjust at the dark room. 1) Set white balance to **Cool**. 2) Adjust All cut off to start some pixels emission at black 2% area and no emission at black 0% area. 3) Write down all cut off data. 4) Set white balance to **Nornal**. 5) Adjust All cut off to set same data of Cool mode. 6) Set white balance to **warm**. 7) Adjust All cut off to set same data of Cool mode.

11 Trouble shooting guide

11.1. Self Check

11.1.1. Display Indication

1. Self-check is used to automatically check the bus line controlled circuit of the Plasma display.
2. To get into the Self-check mode, press the **volume down** button on the customer controls at the front of the set, at the same time pressing the **OFF-TIMER** button on the remote control, and the screen will show :-



If the CCU ports have been checked and found to be incorrect Or not located then " - - " will appear in place of " OK "

Note:

In case of disconnected of H/HY/HZ "IC3699 - -" is displayed.

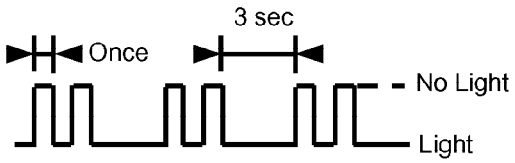
11.1.2. Power LED Blinking timing chart

1. Subject

   Information of LED Flashing timing chart.

2. Contents

   When an abnormality has occurred the unit, the protection circuit operates and reset to the stand by mode. At this time, the defective block can be identified by the number of blinkes of the Power LED on the front panel of the unit.

Blinking times	Blink timing	Contents & Check point
Twice		SC,SS,C board
Three		D board
Four		P board (Check P7,P8 protection circuits)
Six		Fan circuit / Fan stop Check Pin3 of P10 to P13 connectors.

3. Remarks

   Above Fan function is operated during the fans are installed.

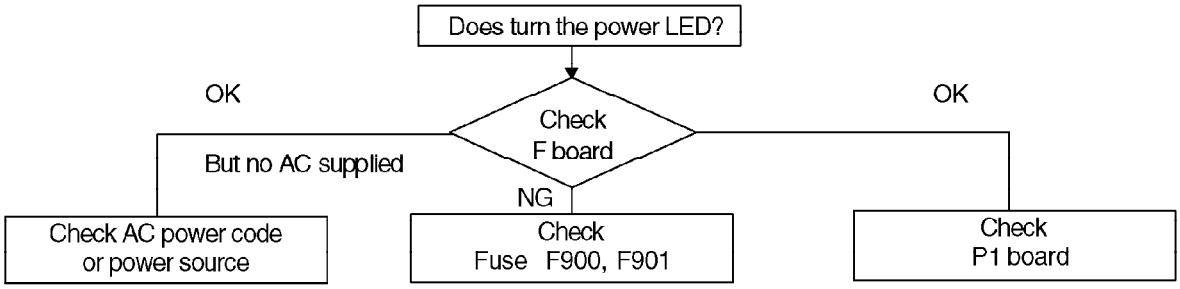
11.2. No Power

First check point

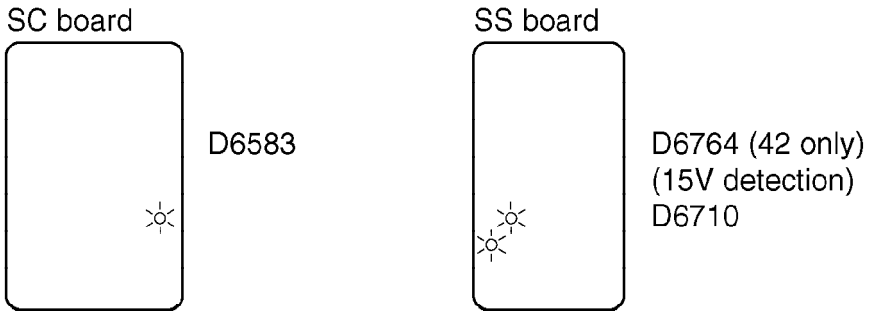
There are following 3 states of No Power indication by power LED.

1. **No lit**
2. **Green is lit then turns red blinking a few seconds later.**
3. **Only red is lit.**

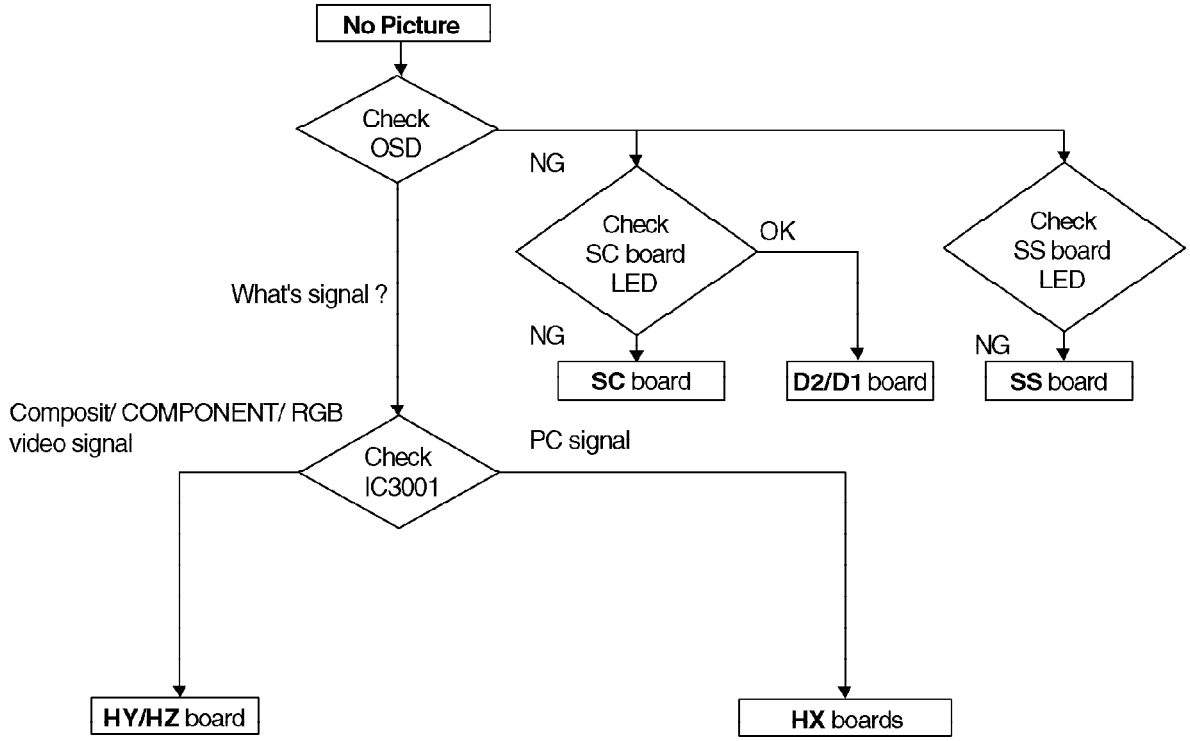
1. No lit



Drive circuits LED indicator

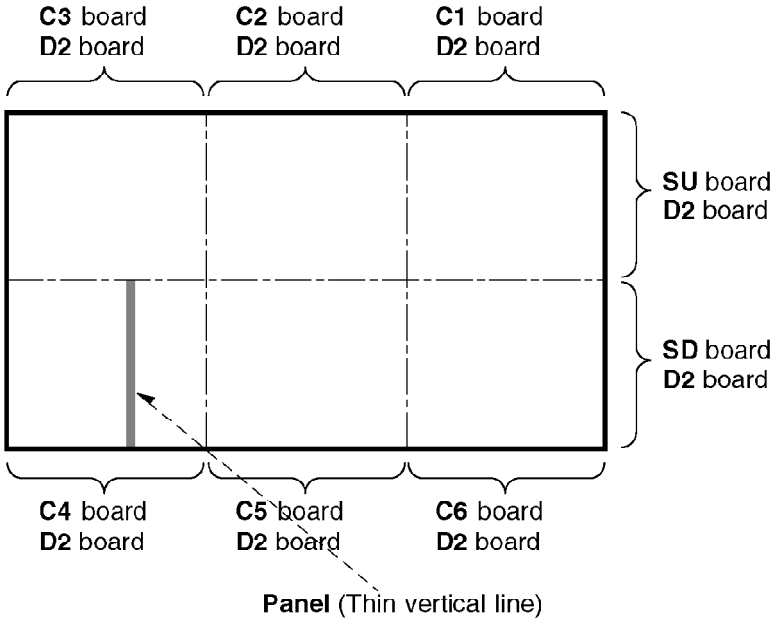


11.3. No Picture



11.4. Local screen failure

Plasma display may have local area failure on the screen. Fig - 1 is the possible defect P.C.B. for each local area.



<Local screen failure chart>

Fig - 1

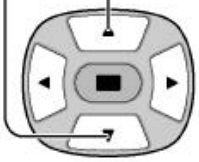
12 Option Setting

How to access the Option menu

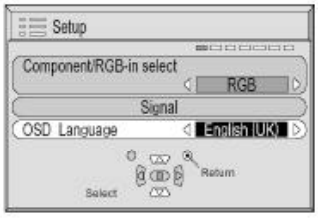
1

Press to display the Setup menu.

2



Press to select OSD Language.

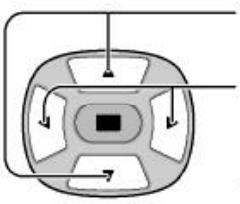


3

Press down for more than 3 seconds to display the Option menu.

Setting the Option menus

1



Press to select the desired item.

Press to select the desired function.

The option menu will disappear 60 seconds after operation.

2

Press to exit Option menu.

Hidden Option Menu for GPH5D2 series

GPH5D2 chassis series have special function and operation setting facility called Option Menu. This Option Menu is useful for special function required customers. This should be set at the installation stage. The end user could not set or change these because of hidden On screen menu.

Option menus	default setting	Contents
Wobbling	Off	Wobbling operation On/Off. The outline of burnt image will be blurred by intermittent image sift.
Off-timer function	Enable	Off-timer operation Enable/Disable.
On Screen display	On	Enable/Disable to display input mode indication after power on and no signal indication.
Initial Input	Off	Sets the initial input mode when the power is turned on . Allow input mode selection while power is on.
Initial VOL. level	Off	Sets the initial volume level when the power is turned on. Allow Volume control while power is on.
Maximum VOL. Level	Off	Sets the maximum volume to desired level. Volume cannot exceed this level.
INPUT lock	Off	Fixes the input mode to AV, Component/RGB or PC. Can not change input mode by input selection key.
Button lock	Off	Enable/Disable front operation buttons (Input and/or volume up/down)
Studio W/B	Off	Set warm mode color temperature to 3,200 Kelvin.
Remocon User Level	Off	Remote key invalidation. Off : Valid key is all key of remote. User1 : Valid key are only Stand-by (ON/OFF), Input, Status, Surround, Sound mute On/Off, and volume adjustment. User2 : Valid key is only Stand-by (ON/OFF). User3 : All keys are null and void

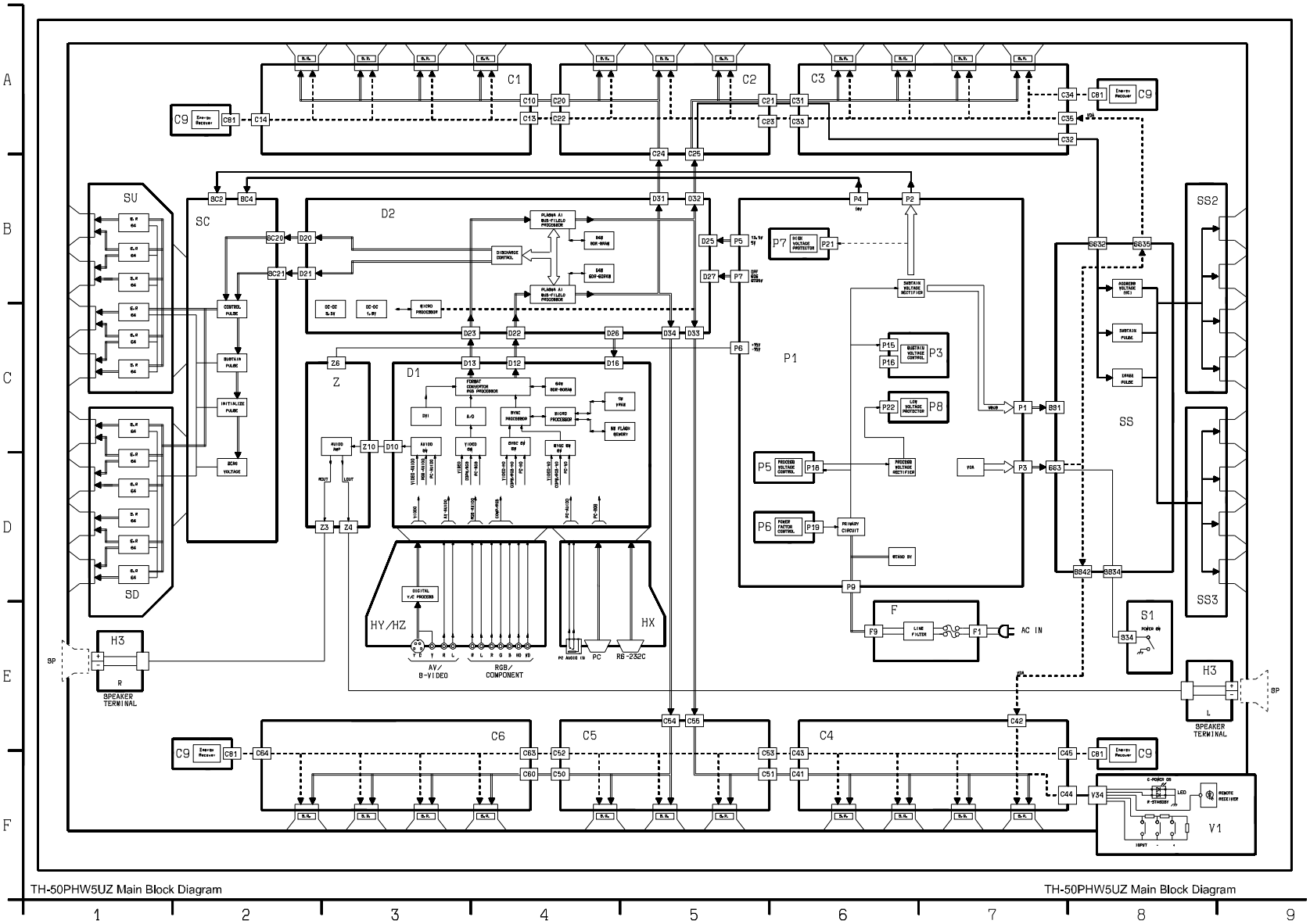
Note :

How to set Remocon User Level and Remote ID off

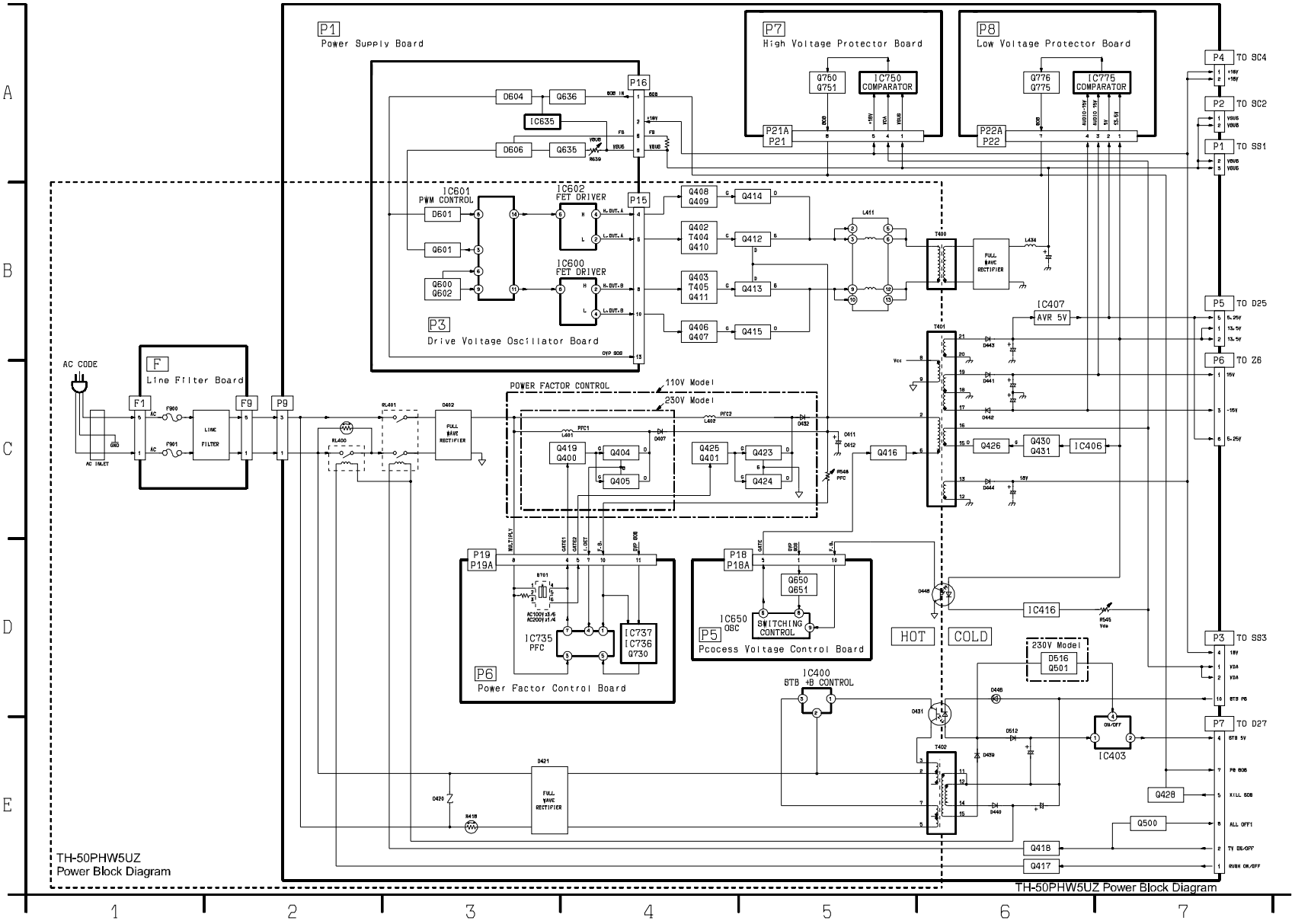
1. Access service mode (CAT-mode) and press SET UP key on remote.
2. Accsess Hidden option menu.
3. Change Remocon User Level and/ or Remote ID set to Off.

13 Block Diagram

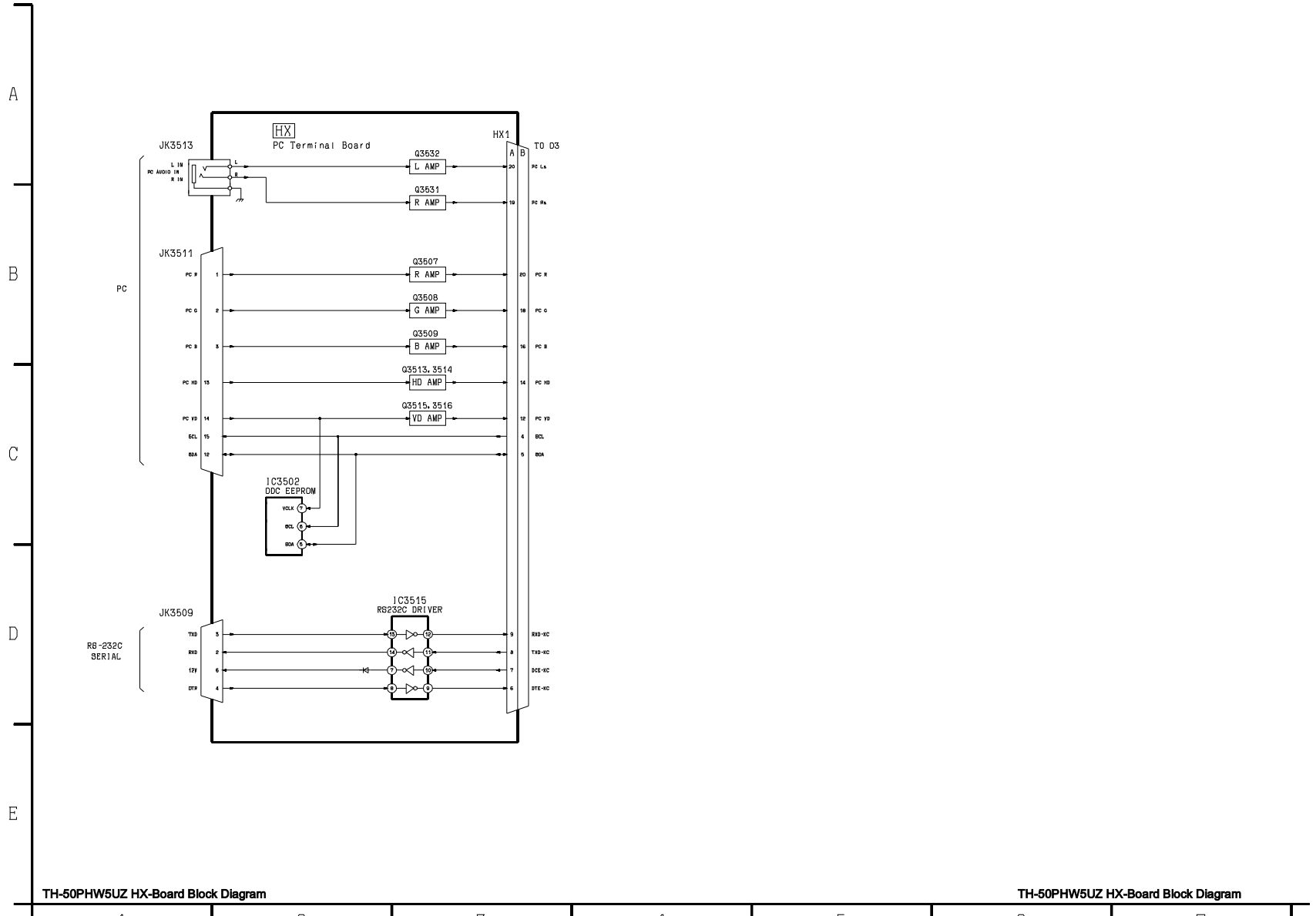
13.1. Main Block Diagram



13.2. Power Block Diagram



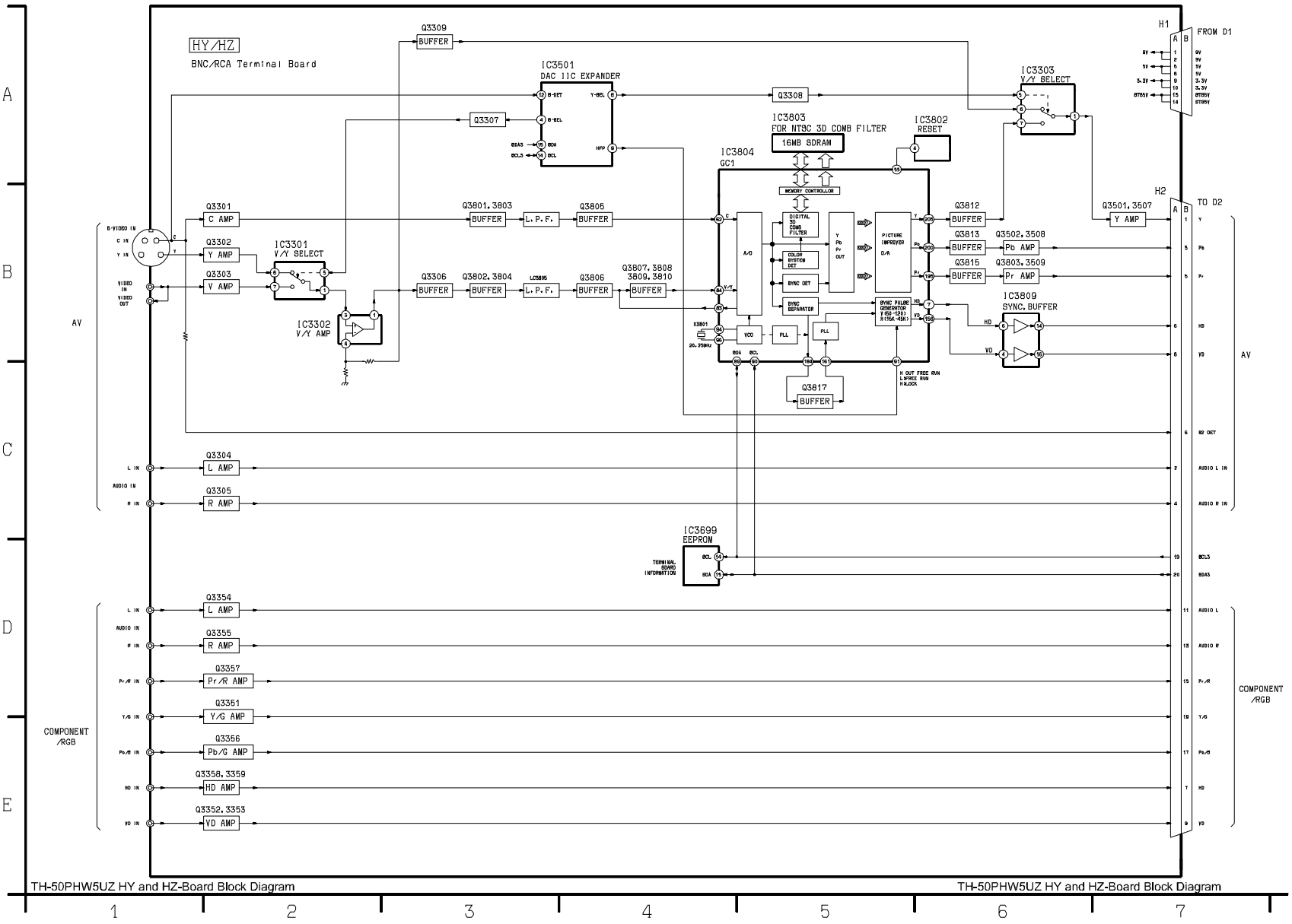
13.3. HX-Board Block Diagram



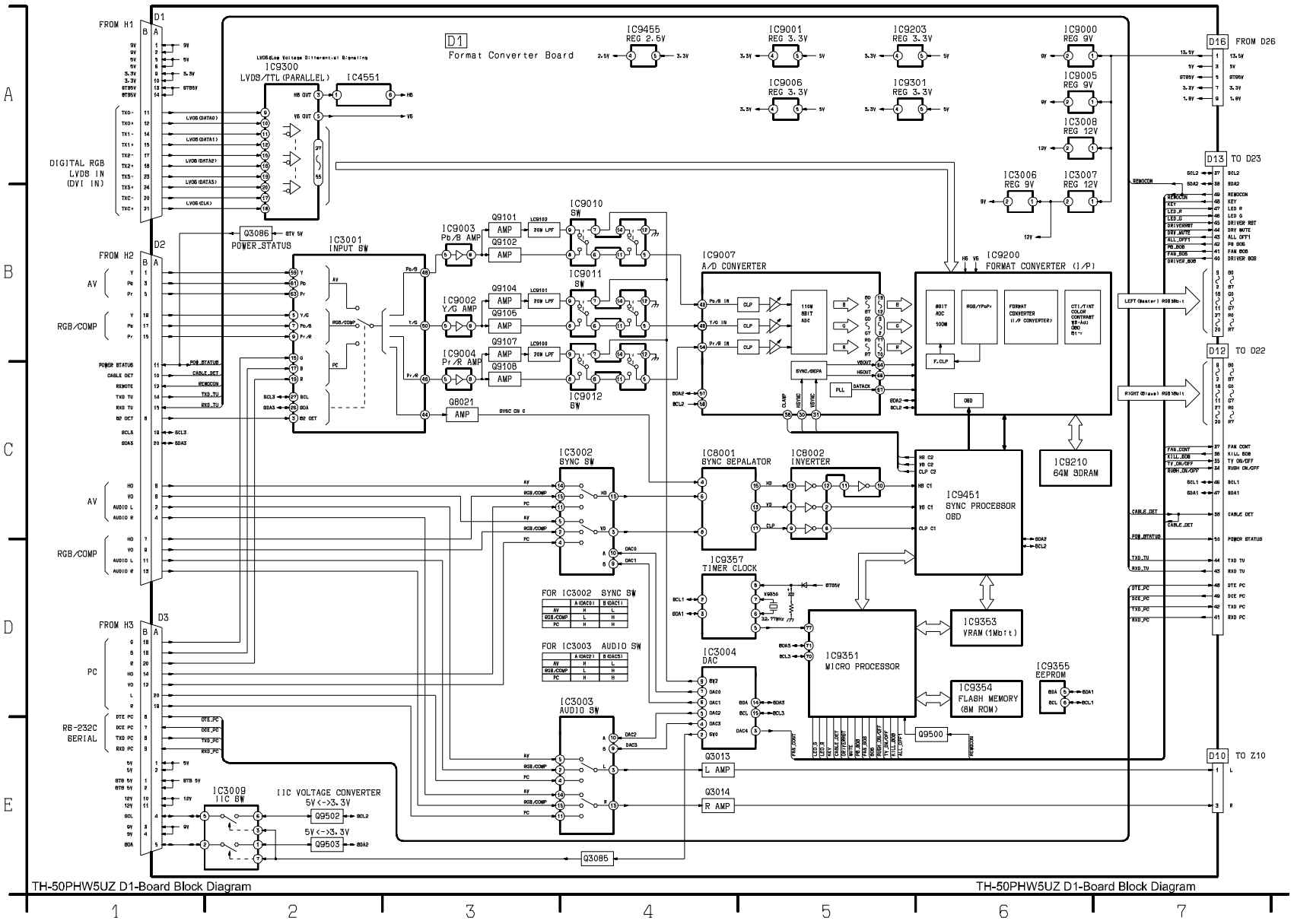
TH-50PHW5UZ HX-Board Block Diagram

TH-50PHW5UZ HX-Board Block Diagram

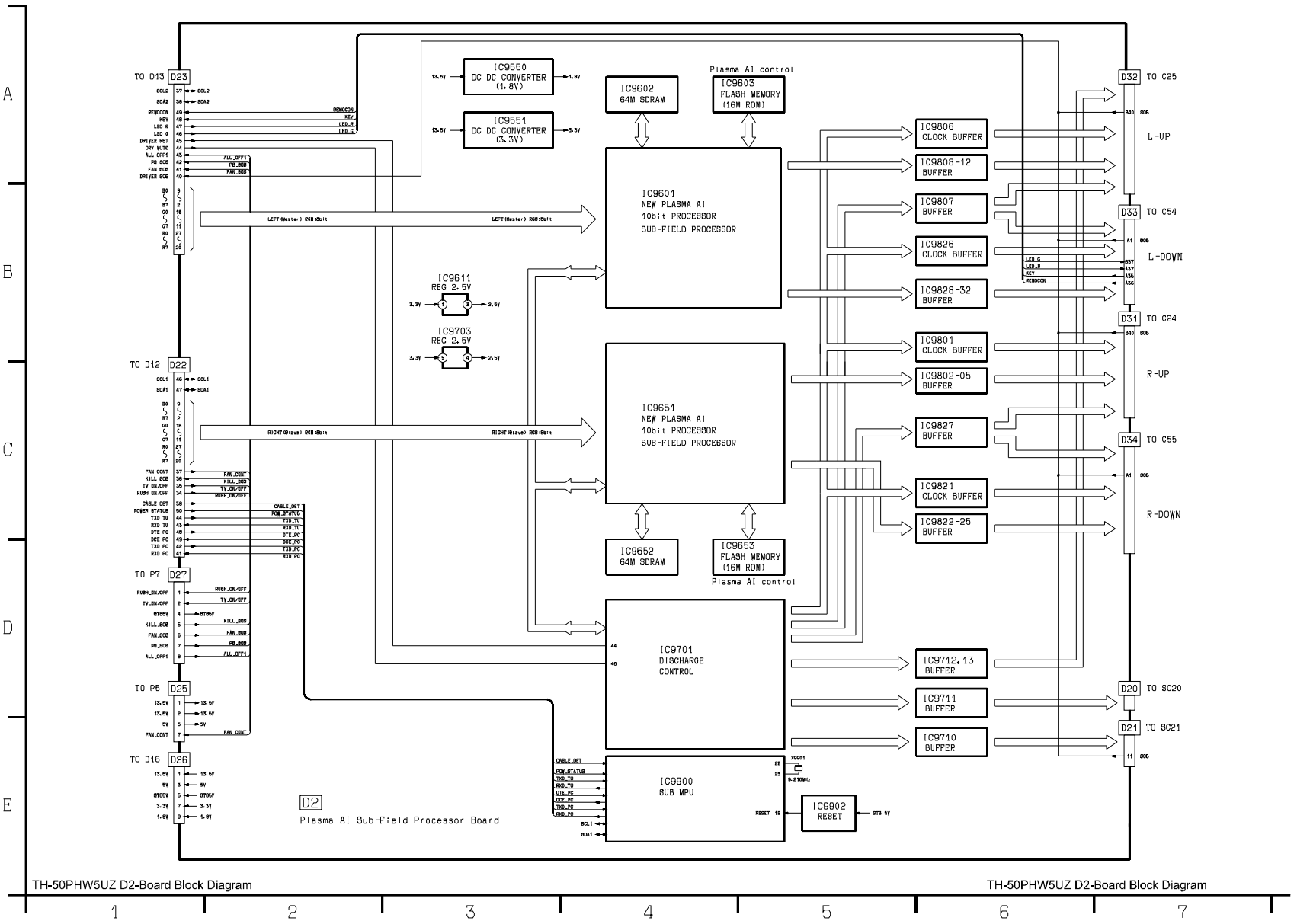
13.4. HY and HZ-Board Block Diagram



13.5. D1-Board Block Diagram

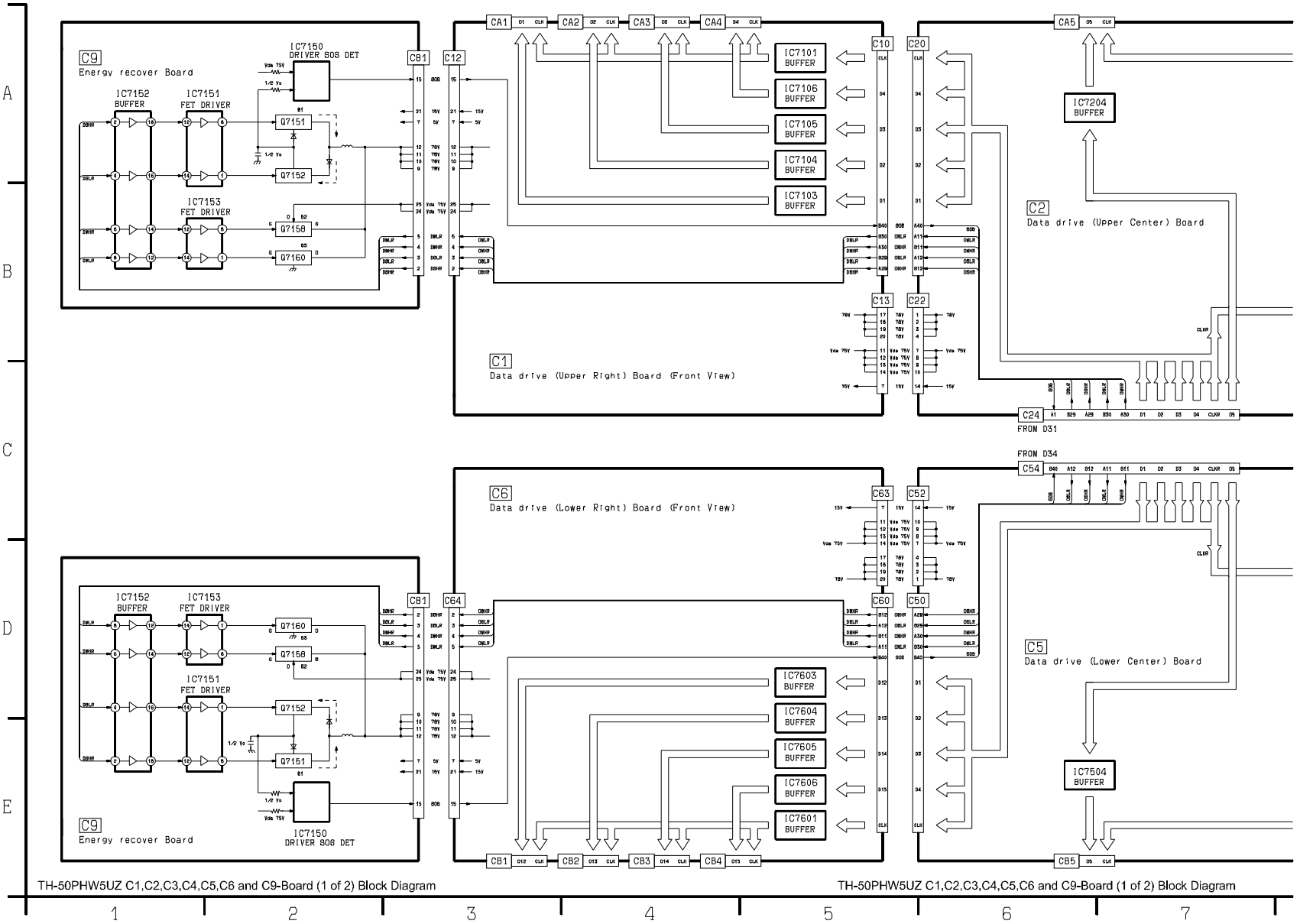


13.6. D2-Board Block Diagram



TH-50PHW5UZ D2-Board Block Diagram

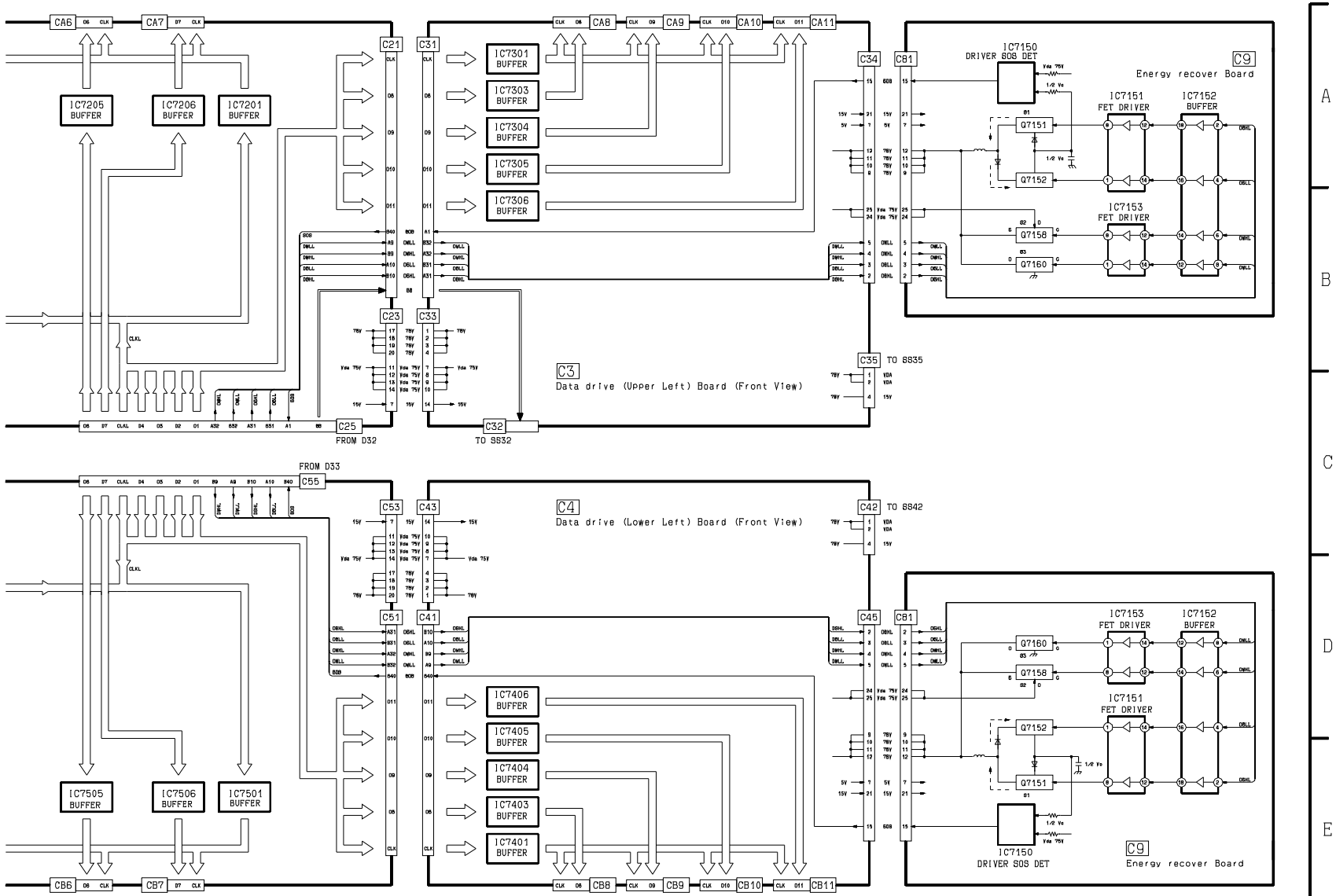
13.7. C1, C2, C3, C4, C5, C6 and C9-Board (1 of 2) Block Diagram



TH-50PHW5UZ C1,C2,C3,C4,C5,C6 and C9-Board (1 of 2) Block Diagram

TH-50PHW5UZ C1,C2,C3,C4,C5,C6 and C9-Board (1 of 2) Block Diagram

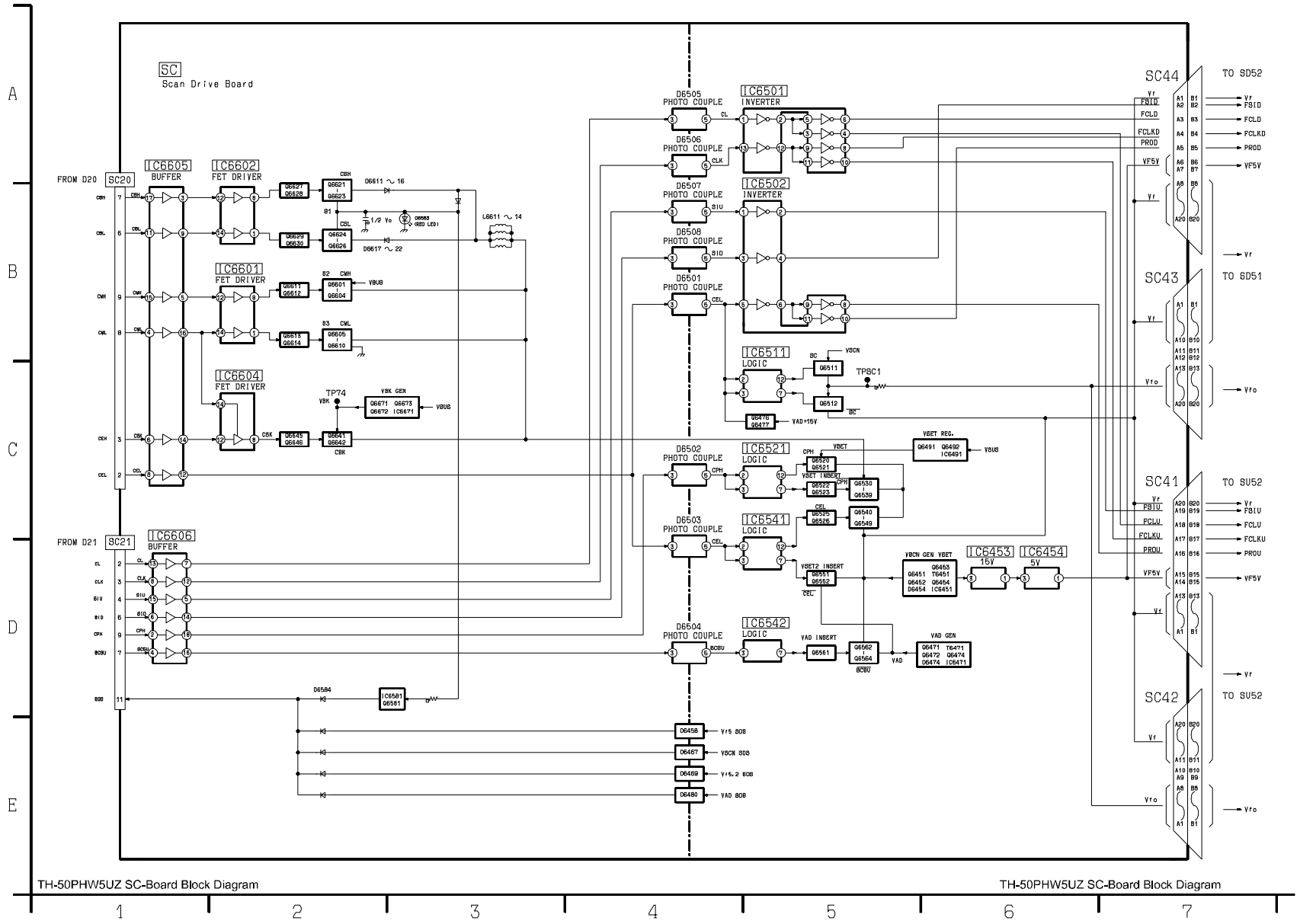
13.8. C1, C2, C3, C4, C5, C6 and C9-Board (2 of 2) Block Diagram



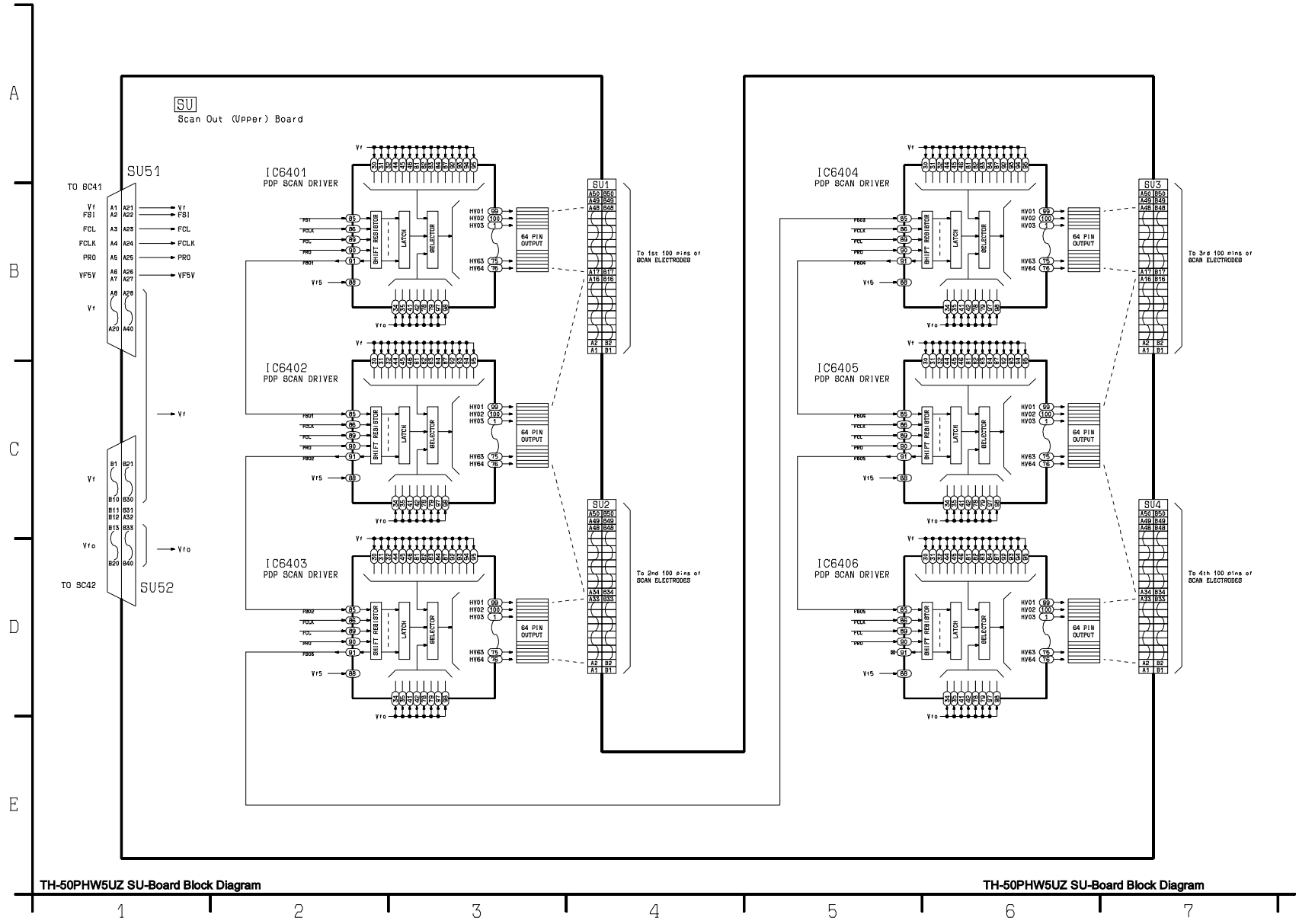
TH-50PHW5UZ C1,C2,C3,C4,C5,C6 and C9-Board (2 of 2) Block Diagram

TH-50PHW5UZ C1,C2,C3,C4,C5,C6 and C9-Board (2 of 2) Block Diagram

13.9. SC-Board Block Diagram



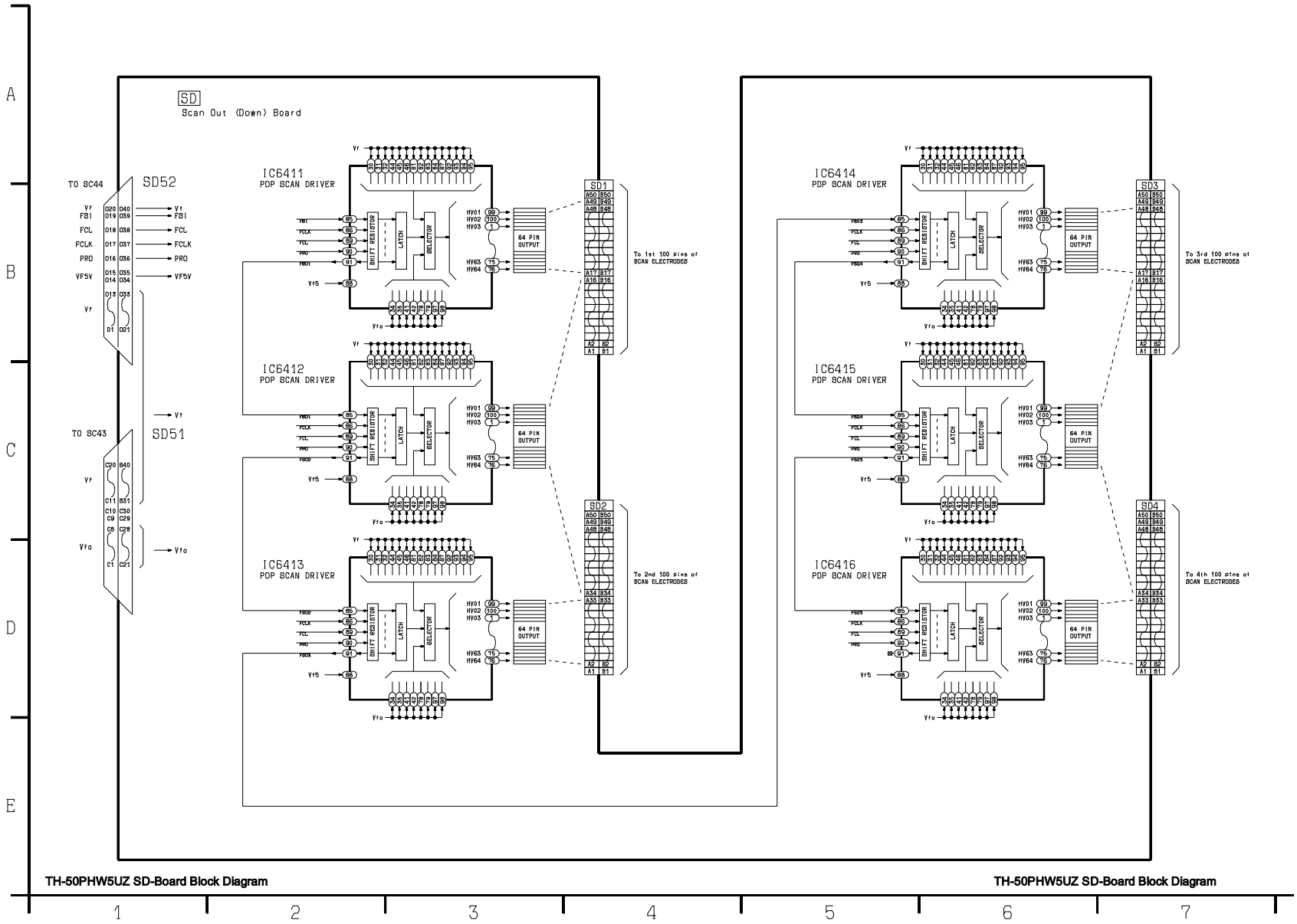
13.10. SU-Board Block Diagram



TH-50PHW5UZ SU-Board Block Diagram

TH-50PHW5UZ SU-Board Block Diagram

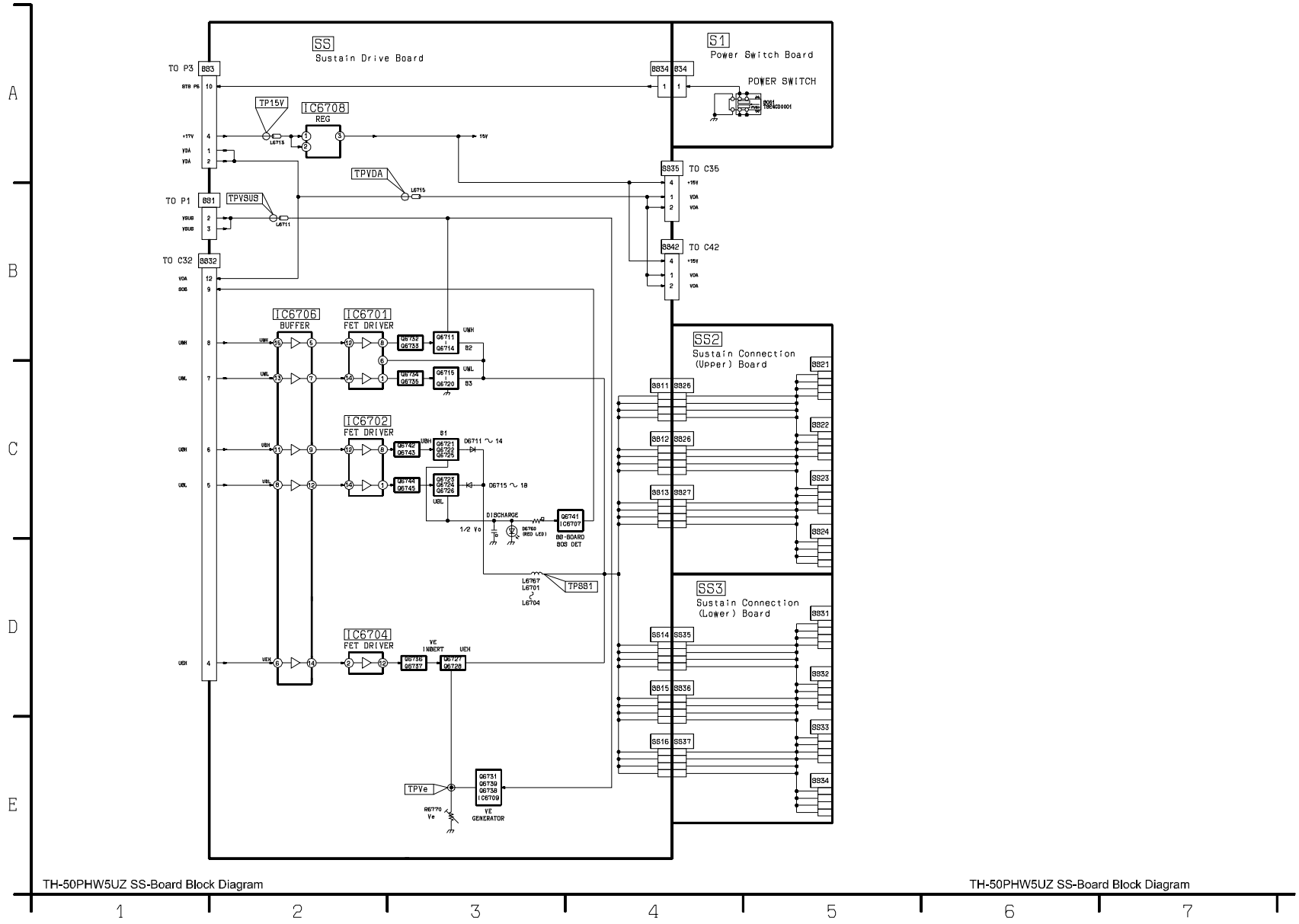
13.11. SD-Board Block Diagram



TH-50PHW5UZ SD-Board Block Diagram

TH-50PHW5UZ SD-Board Block Diagram

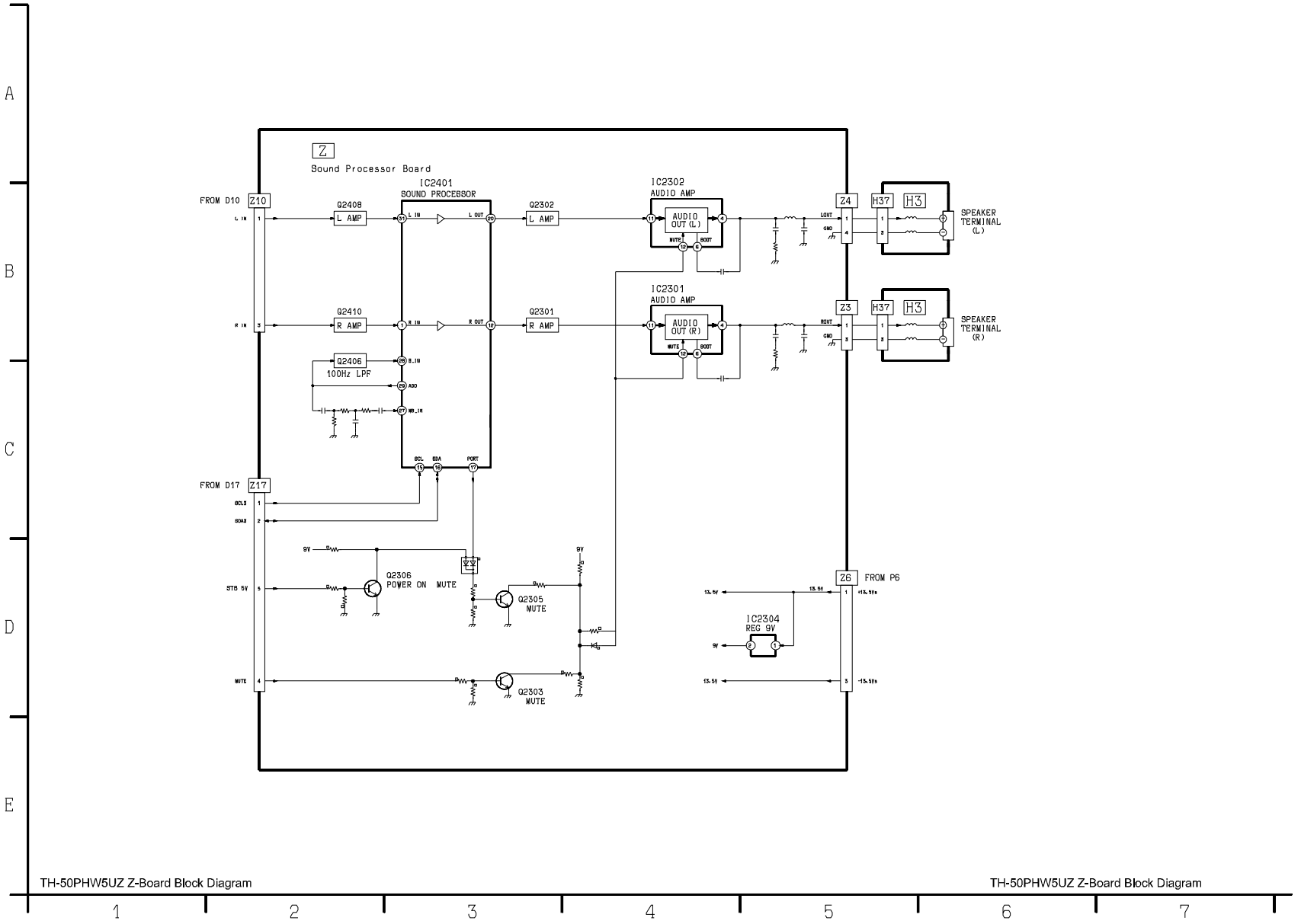
13.12. SS-Board Block Diagram



TH-50PHW5UZ SS-Board Block Diagram

TH-50PHW5UZ SS-Board Block Diagram

13.13. Z-Board Block Diagram

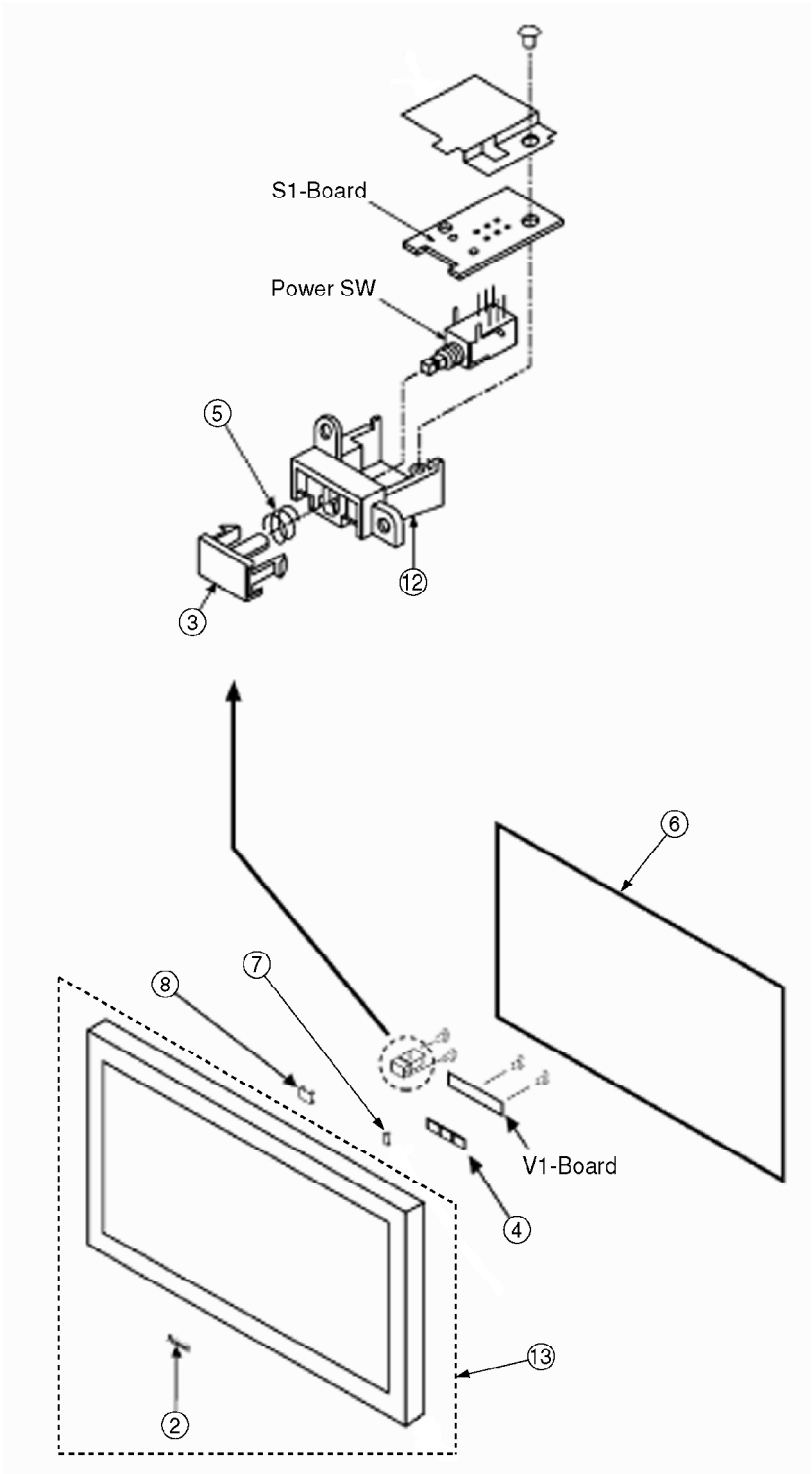


TH-50PHW5UZ Z-Board Block Diagram

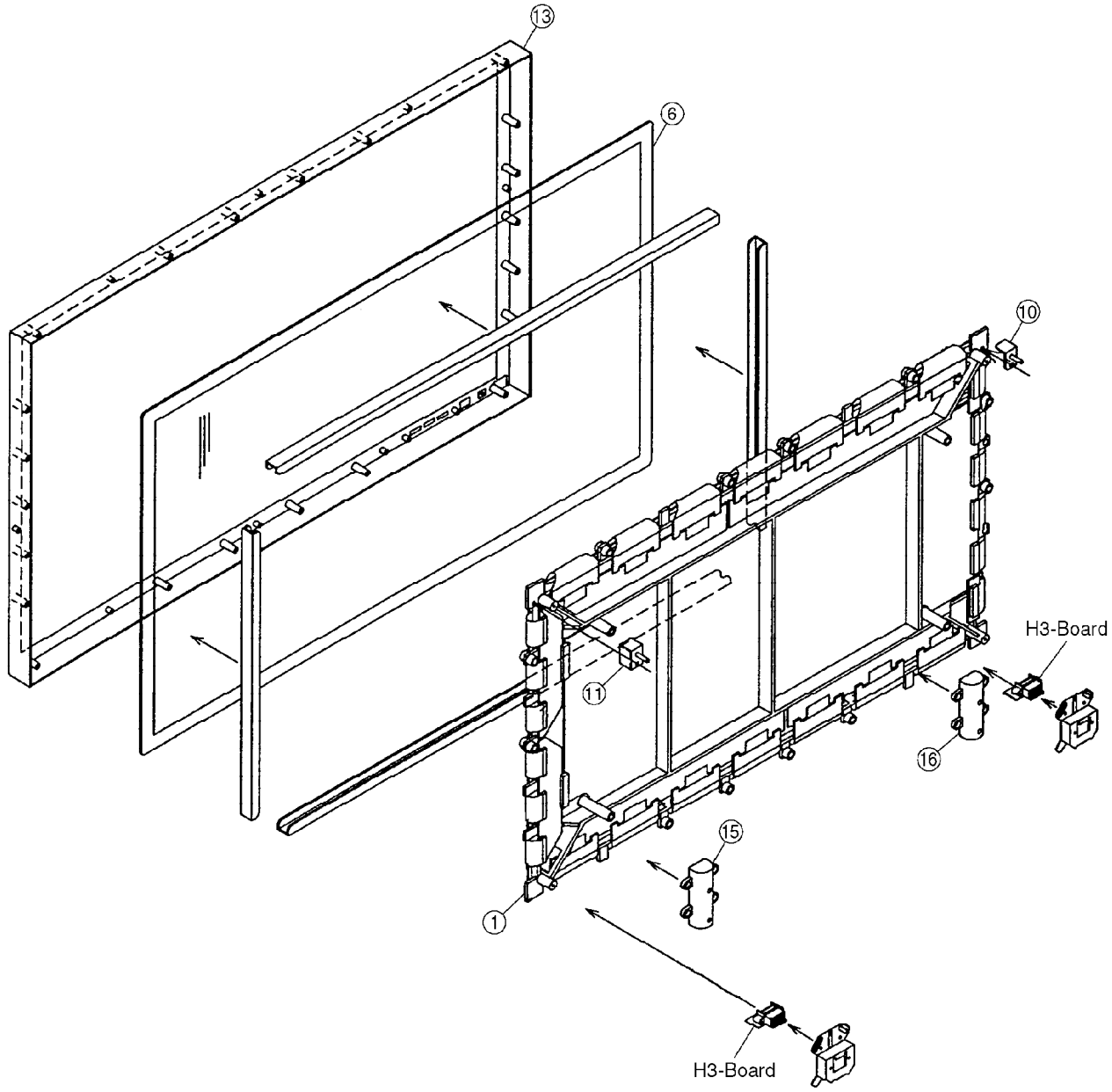
TH-50PHW5UZ Z-Board Block Diagram

14 Parts Location

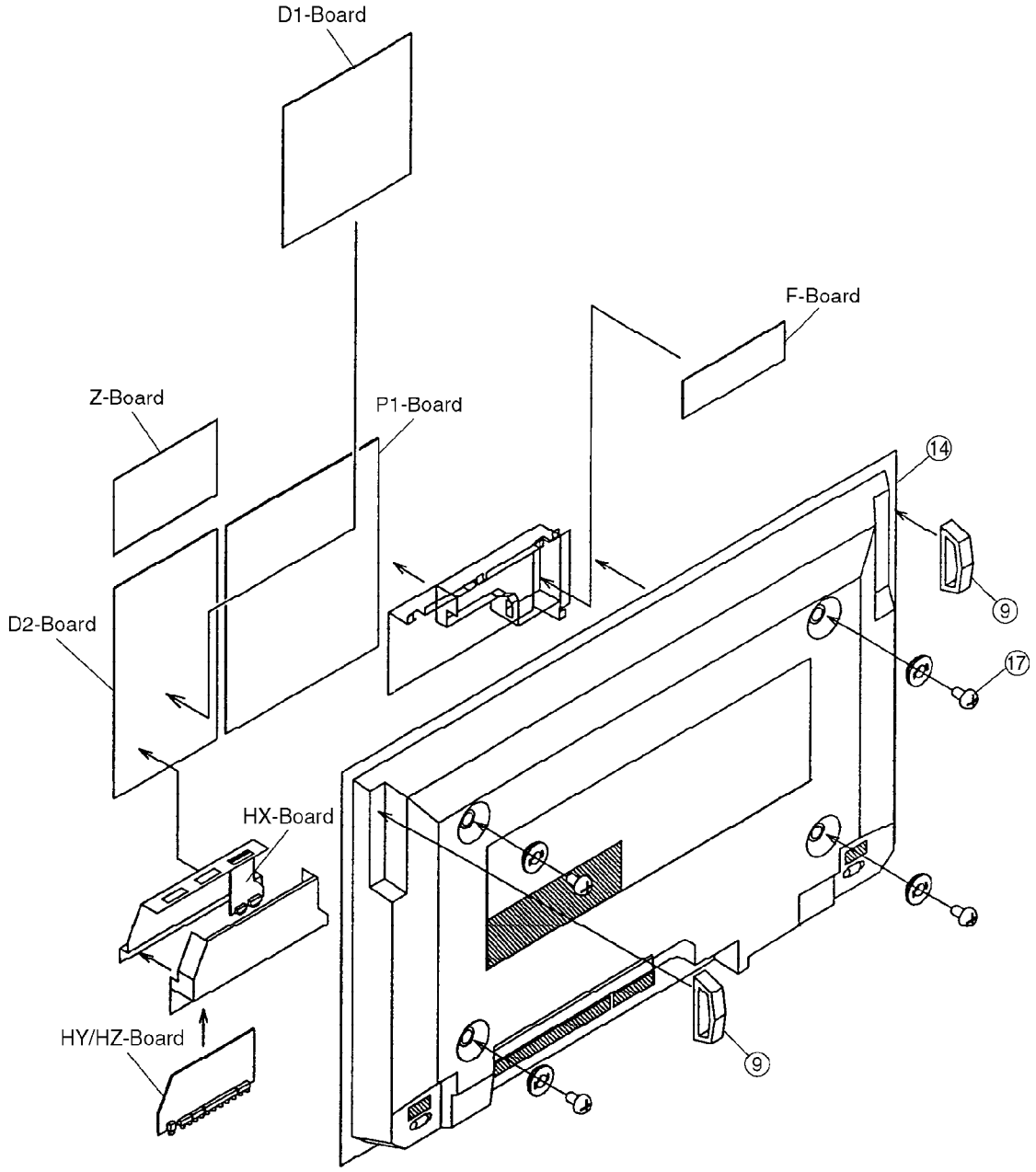
14.1. Parts Location1



14.2. Parts Location2



14.3. Parts Location3



15 Mechanical Replacement Parts List

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
	EUR646525	REMOTE CONTROL	1	
	FBL06A12LS	FAN	4	
	J0KD00000049	FLAT CORE	4	
	J0KF00000018	FILTER	1	
	J0KF00000018	FILTER	1	
	J0KG00000054	NOISE FILTER	2	
	K2CG3DH00025	AC CORD	1	⚠
	K5Y802B00001	FUSE	2	⚠
1	MD50H05A1J	PLASMA DISPLAY PANEL	1	⚠
2	TBMA008	PANASONIC BADGE	1	
3	TBXA28208	POWER BUTTON	1	
4	TBXA28508	HINDGE BUTTON	1	
5	TESD031	SPRING	1	
	THEA068N	SCREW	4	
	THEL023Z	SCREW	13	
	THEL027N	SCREW	19	
	THTD004	SCREW	3	
	THTF003Y	SCREW	38	
6	TKGA5090	FRONT GLASS	1	
7	TKKC5105	LED PANEL	1	
8	TKPA43802	REMOCON RECEIVE PANEL	1	
9	TKRA20501	HANDLE	2	
	TMKG252	CUSHION	2	
	TMKG253	CUSHION	2	
	TMKX236	INSULATOR	1	
	TMKX258	INSULATOR	1	
	TMM14467	SPACER	2	
	TMM15414-2	CLAMPER	1	
	TMM25401	CLAMPER	3	
	TMM7464-2	CLAMPER	2	
	TMM7468-1	CLAMPER	3	
	TMM81488	CLAMPER	2	
10	TMMD007-1	BRACKET(RIGTH)	1	TMMD007
11	TMMD008-1	BRACKET(LEFT)	1	TMMD008
	TMME047	CLAMPER	2	
	TMME061	CLAMPER	2	
	TMME075	EADG SADOLE	2	
	TMME152	CLAMPER	2	
	TMME187	CLAMPER	2	
	TMME190	CLAMPER	1	
	TMMX043	SPACER (UPPER)	2	
	TMMX044	SPACER (BOTTOM)	2	
12	TMWC006-1	POWER BUTTOM BRACKET	1	
	TMXX021-1	CORE HOLDER	4	
	TPCA97201A	CARTON BOX(BOTTOM)	1	⚠
	TPD169487	JOINT	4	
	TPDA0510-1	CUSHION(UPPER RIGHT)	1	
	TPDA0511-1	CUSHION(UPPER LEFT)	1	
	TPDA0512	CUSHION(UPPER CENTER)	1	
	TPDA0513	CUSHION(BOTTOM RIGHT)	1	
	TPDA0514	CUSHION(BOTTOM LEFT)	1	
	TPDA0515-2	CUSHION(BOTTOM CENTER)	1	
	TPDA0645	PAD	2	
	TPDF0536	PAD(TOP)	1	
	TPDF0737	PAPER BOX	1	
	TPEH170	PROTECT COVER	1	
	TQBC0453-1	INSTRUCTION BOOK(ENGLISH)	1	⚠
	TQBC0454-1	INSTRUCTION BOOK(FRENCH)	1	⚠
	TQBC0455-1	INSTRUCTION BOOK(SPANISH)	1	⚠

Ref. No.	Part No.	Part Name & Description	Pcs	Remarks
	TQZW235	SHEET	1	
	TSXL139	CABLE	1	
	TSXL146	CABLE	1	
	TSXL212	CABLE (D2-C)	4	
	TSXL222	CABLE (C-C)	4	
	TSXL223	CABLE (C1-C2/C2-C)	4	
13	TTEA0102	ESCUTCHEON	1	⚠
14	TTUA0576	REAR COVER	1	⚠
	TXAJS010MHS	AC INLET	1	K2AH3H000021 ⚠
15	TXFMZ010MHS	STAND BRACKET(LEFT)	1	
16	TXFMZ020MHS	STAND BRACKET(RIGHT)	1	
	TXJSPL0MHS	SP LEAD(LEFT)	1	
	TXJSPR0MHS	SP LEAD(RIGHT)	1	
	XTB4+10A	SCREW	23	
	XTBT964	SCREW	2	
	XTS3+10J	SCREW	8	
	XTV3+6J	SCREW	2	
	XTW3+8T	SCREW	3	
	XYC3+FF8	SCREW	2	
	XYC4+FJ35FZ	SCREW	19	
	XYN3+F10	SCREW	19	
	XYN3+F10FZ	SCREW	2	
	XYN3+F8	SCREW	115	
	XYN4+E8	SCREW	1	
	XYN5+C20	SCREW	8	
17	XYN8+F20FZ	SCREW	4	
	XZBT6506	POLY BAG	1	
RTL	TNPA2510	CIRCUIT BOARD C1	1	⚠
RTL	TNPA2511	CIRCUIT BOARD C2	1	⚠
RTL	TNPA2512	CIRCUIT BOARD C3	1	⚠
RTL	TNPA2513	CIRCUIT BOARD C4	1	⚠
RTL	TNPA2514AB	CIRCUIT BOARD C5	1	⚠
RTL	TNPA2515	CIRCUIT BOARD C6	1	⚠
RTL	TNPA2517	CIRCUIT BOARD SU	1	⚠
RTL	TNPA2518	CIRCUIT BOARD SD	1	⚠
RTL	TNPA2519	CIRCUIT BOARD SS2	1	⚠
RTL	TNPA2520	CIRCUIT BOARD SS3	1	⚠
RTL	TNPA2608	CIRCUIT BOARD C9	4	⚠
RTL	TNPA2249	CIRCUIT BOARD H3	1	⚠
RTL	TXN/F10MHS	CIRCUIT BOARD F	1	⚠
RTL	TNPA2445	CIRCUIT BOARD Z	1	⚠
RTL	TZTNP01MHSB	CIRCUIT BOARD D1	1	⚠
RTL	TNPA2427AB	CIRCUIT BOARD D2	1	⚠
RTL	TXNP110MHS	CIRCUIT BOARD P1	1	⚠
RTL	TNPA2566	CIRCUIT BOARD P3	1	⚠
RTL	TNPA2567	CIRCUIT BOARD P5	1	⚠
RTL	TNPA2568	CIRCUIT BOARD P6	1	⚠
RTL	TNPA2569	CIRCUIT BOARD P7	1	⚠
RTL	TNPA2570	CIRCUIT BOARD P8	1	⚠
RTL	TNPA2434AB	CIRCUIT BOARD SC	1	⚠
RTL	TXNSS10MHS	CIRCUIT BOARD SS	1	⚠
RTL	TNPA2283AC	CIRCUIT BOARD S1	1	⚠
RTL	TNPA2282AC	CIRCUIT BOARD V1	1	⚠
RTL	TZTNP02KESE	CIRCUIT BOARD HX	1	⚠
RTL	TXNHY30JHS	CIRCUIT BOARD HY	1	⚠